



BUSINESS PLAN FOR CWG PILOT PROGRAM



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MISSION STATEMENT

Chaninik Wind Group's (CWG) vision is to be the heartbeat of the Lower Kuskokwim region. The group intends to achieve this mission by combining the talents and resources of its member communities to build and operate more efficient energy systems. In doing so, its member communities will benefit from lower energy costs, increase self-reliance due to decreased dependency on fossil fuels, and in the making of CWG, grow the ability to create jobs and economic opportunities throughout the region.

STATEMENT OF PURPOSE

The purpose of the Chaninik Wind Group (CWG) is to create a sustainable regional energy services organization. This organization is a formal alliance of community utilities, backed by community councils, each with a common goal of community sustainability through energy efficiency. Experience of building wind diesel systems, and of individual communities operating their own independent utilities has taught the leadership of CWG two lessons. The first lesson is that the goals are important and necessary and are only achievable by combining the collective resources and talents of their small communities. And secondly, to be successful they must address the broader more comprehensive community and regional energy needs, which include asset management, weatherization, conservation, electrical distribution, long-term planning, financial management, transportation, water and waste water, renewable energy programs, and environmental protection. Today their individual communities look to the utilities to coordinate, develop and implement these programs in each community. The CWG members recognize the need for a comprehensive approach, but lack the organizational capacity to address these needs. The second lesson is that the CWG needs to be a stronger organization.

Working together the CWG has been able to build wind-diesel smart grids for each of their respective communities. The purpose of this business plan is to carry CWG's momentum forward to sustainable communities, by creating a shared services network that links scattered resources to build more effective, more efficient and more productive energy systems. The CWG becomes the "heartbeat of the region" by extending that experience regionally, to bring lower energy costs, reduced dependency on fossil fuels and new jobs to the other communities in their region.

The business plan is a framework for regionally self-sustaining utilities. The benefits are derived from improved operations, maintenance, and management. The CWG Board of Directors and representatives of member communities developed this business plan based on a pilot program focused on building local capacity that transitions to a stand alone operation in its third year.

EXECUTIVE SUMMARY

Over the past six years, the Chaninik Wind Group projects has been involved in a Phase 1 pilot program that consisted of working together to build wind systems in each of its member villages. During these projects, the CWG communities, with the assistance of Intelligent Energy Systems, LLC of Anchorage, developed a series of training and technical assistance programs intended to build a pathway to 50% fuel displacements for power generation and home heating by 2025. The first phase of these projects based on wind heat systems in Kwigillingok, Kongiganak, and Tuntutuliak are nearly complete. A project in Kipnuk has been expanded to include a new power plant with the target for completion in 2015. Because of the strong wind resources in the region and the success in other communities with wind, Kipnuk will complete a community wind system by 2015. The commissioning of the wind systems in Kong, Kwig and Tunt, marks the ending of the Phase 1 Pilot Program. This business plan describes the follow-on phases of the development of CWG that are needed to create a self-reliant regional energy services group. The plan describes the funds and activities required.

The primary focus of this plan is to build CWG managerial capacity. The pathway to building capacity is through experience. Local capacity is built by supporting and training local managers and operators to design and run programs that give them the perspective and training to deliver high level community services. The plan links the community needs with the program resources and local learning and experience to the CWG alliance's three primary objectives:

- 1) Lowering the cost of energy.** The business plan provides a method to address the broader community needs that include weatherization, conservation, and transportation programs. Lowering the cost of energy implies optimizing existing systems. This requires attention and application of best management practices.
- 2) Reducing dependency on fossil fuels.** The rising and unpredictable cost of diesel fuel has a major impact on the economic health of CWG communities and the region. Reducing dependency on fossil fuels keeps dollars from leaving CWG communities. Programs such as conservation, weatherization, and the use of renewable energy systems like wind, solar and biomass, when applied properly on a community wide basis, can result in permanently displacing 50% of existing fuel usage.
- 3) Creating jobs and economic opportunities.** Jobs add meaning to life and provide income needed to support families. Jobs grow from training and development opportunities. The CWG has identified at least 20 permanent jobs in its continued operation. These jobs can be self supporting. While programs like weatherization and energy conservation measures offer temporary jobs, programs like power line construction, wind and solar technicians, diesel mechanics, IT professionals, transportation, environmental cleanup, and project management have the potential to reach out of the region for larger markets. Lower energy costs foster economic activities across the communities by making small businesses like fishing, stores and service businesses possible.

The business plan measures progress toward these goals in terms of fuel displaced, the cost of electricity to customers and the number of jobs created.

The plan is based on having a regional collaborative, like CWG, that initiates and coordinates a broad range of multi-village energy efficiency and energy related activities. Through these projects, CWG would combine their resources and implement three strategies, each of which builds on the other.

These strategies are:

- Increasing the effectiveness of the CWG organization to manage programs and projects.
- Using that capacity to increase the efficiency of all member community energy systems.
- And finally, by using those program opportunities to develop job skills, training and work/business opportunities.

The program request is \$875,000. This funding is needed as initial capital to establish the infrastructure and personnel for the program in this plan to be executed. These funds will be supplemented by federal funding and local funding from utility and project operations to generate total revenues over 3 years of \$3,200,000. After 3 years, it is anticipated that CWG can move from a pilot project to a stand alone entity. This level of assistance is needed for CWG to demonstrate its value and grow its membership to more communities.

The majority of the funds will be used to establish a functional shared services network among the four principle communities. Its aim is to standardize utility operations and improve effectiveness of local system management and the CWG organization. This program includes:

1. Operations, management and maintenance in training and support needed to establish best practices for utility operations.
2. Advanced training on diesel engines, control systems and information technology.
3. Coordinating policies and programs among utility operations, and within community services organizations for allied utility management.
4. Planning the development, implementation and management of a broad range of multi-village coordinated energy efficiency programs. This includes energy planning, asset assessment, weatherization, conservation, housing improvement and community development projects.
5. Develop a village energy systems circuit rider program that enables village electric utilities to identify and implement best practices and addresses the multiple barriers to energy efficiency and energy system productivity. Specific programs would be developed for: utility financial management, power system preventative and long-term maintenance; wind and solar systems; electrical distribution and metering;
6. Programs would be created to plan for and engage communities more fully in weatherization/energy conservation; village water/sewer facilities integration; and village infrastructure development and planning.
7. Provide and support a shared management infrastructure which has the capacity and responsibility to provide long range community and asset investment planning and assistance.
8. Establish an electrical distribution system infrastructure repair, construction and training program. This is a program which has begun and needs to be given sufficient support to be carried through across all communities.

9. Establish stronger regional partnerships and allies for expanding effective energy system operations, increasing energy efficiency and job creation.

This plan is divided by two interrelated themes. The first theme of the CWG Business Plan describes the economic benefits of joint operation of the wind-diesel projects. These benefits are only possible through effective management and optimization of system performance as derived from reliable operations and maintenance. The remainder of the plan presents program objectives as well as the budgetary and policy requirements for building broader community programs. This part of the plan offers proposed scenarios for CWG to use existing energy efficiency projects and programs to reach its goals. In the end, ongoing sustainability of the CWG depends on profitability which is derived from cost energy savings, energy efficiency and new revenues generated from related enterprise activities. This level of sustainable operations is only possible through the creation and nurturing of an effective organization.

It should be remembered that the directors of CWG represent their respective communities and that to be effective the communities must see the benefits. Meeting this objective will require having a responsive and capable organization that is able to change direction to meet ever-changing needs. This plan, however, starts with programs in three areas that CWG has already identified to offer immediate promise for meeting its shared objectives. These are: the circuit rider training and maintenance programs, the reconstruction of electrical distribution systems, and multi-village weatherization and conservation programs. An effective organization is needed to carry out these plans.

INTRODUCTION

Sustainable communities are built upon motivated individuals combining their talents to address the needs that only they understand.

The Chaninik Wind Group's mission is to become the "Heart Beat of the Region." This business plan is a framework for achieving that objective, based on creating an effective regional multi-community energy services organization. This organization is an alliance of community utilities and is built upon their shared experiences of working together to build wind projects in their respective communities. The alliance needed would have the authority and capacity to continuously address, develop and implement energy and energy efficiency projects across its member communities. As CWG gets stronger, its programs of lowering energy costs, reducing dependency on fossil fuels and creating jobs would extend throughout the region. Because CWG is made up of village residents, its vision can only be accomplished in the context of protecting the values and culture of each community. For the same reason, it is the only organization that has been successful at meeting its community goals and has the best chance of carrying that success forward.

The underlying theme of the CWG business plan is building self-reliance. Self-reliance comes from strengthening management and operations capabilities under a functional combined resources organization. The need for this stronger organization grew out of CWG's experience

building wind projects. All of the utilities needed help with developing wind. All of the communities needed help planning utility improvements. All of the utilities needed help upgrading their diesel operations. All of the utilities had and still have a range of training needs. And all of the utilities recognized how there is so much more to be done to help their communities.

While it is true that each community has somewhat different needs, it is also true that they have so much more in common. Those similarities bring them naturally together and the CWG has emerged as the vehicle that the communities look to to meet those challenges. Therefore, future success requires a stronger alliance that can reach for what it needs and the resources to develop and pay for a competent staff. Through the business plan, CWG brings forward its success with their wind systems to fulfill its vision of becoming the “heartbeat of the region.”

We are forever grateful to Senator Lyman Hoffman, who believed and supported us, and helped us get started. We owe most of our success to Senator Hoffman.

Background

The Chaninik Wind Group was created in 2005, as an alliance of electrical utility managers from four lower Kuskokwim villages of Kwigillingok (Kwig), Tuntutuliak (Tunt), Kipnuk and Kongiganak (Kong). The CWG was created as a non-profit with the vision of becoming the “heartbeat of the region,” but with a focus of installing wind turbines to displace diesel fuel used for power generation. CWG activities have resulted in the accelerated development of wind-diesel power systems in Kongiganak, Tuntutuliak, and Kwigillingok. The CWG has recently been successful in obtaining funds to rebuild electrical distribution systems in villages of Kongiganak, Tuntutuliak, and Kwigillingok. The CWG has also been successful in obtaining funds to towards a new tank farm and power plant in the community of Kipnuk. A follow-up wind project for Kipnuk is being proposed for 2015.

CWG has operated in pilot stage since 2005 and has been successful through contributed and donated efforts of CWG communities and their partners, like Intelligent Energy Systems (IES). Without some way of reducing rising energy costs and dependency on high priced fossil fuels, villages in rural Alaska will soon become unsustainable. Residents are struggling to heat their homes and pay their light bills. The high cost of energy threatens the existence of village life, native cultures and investments in village infrastructure. The CWG villages are Yupik Eskimo communities related by geographic, social and cultural ties. Over the last 3 years, more than \$100 million has been invested in Tuntutuliak and Kongiganak to build runways, schools, boardwalks, clinics and housing. It is anticipated that over the next two years, \$100 million will be invested in Kwigillingok and Kipnuk for schools, energy systems, water systems, runways, clinics, and housing. Without programs to efficiently operate, maintain, and rebuild energy systems the residents of these communities will have to leave for places where energy is more affordable.

The New CWG

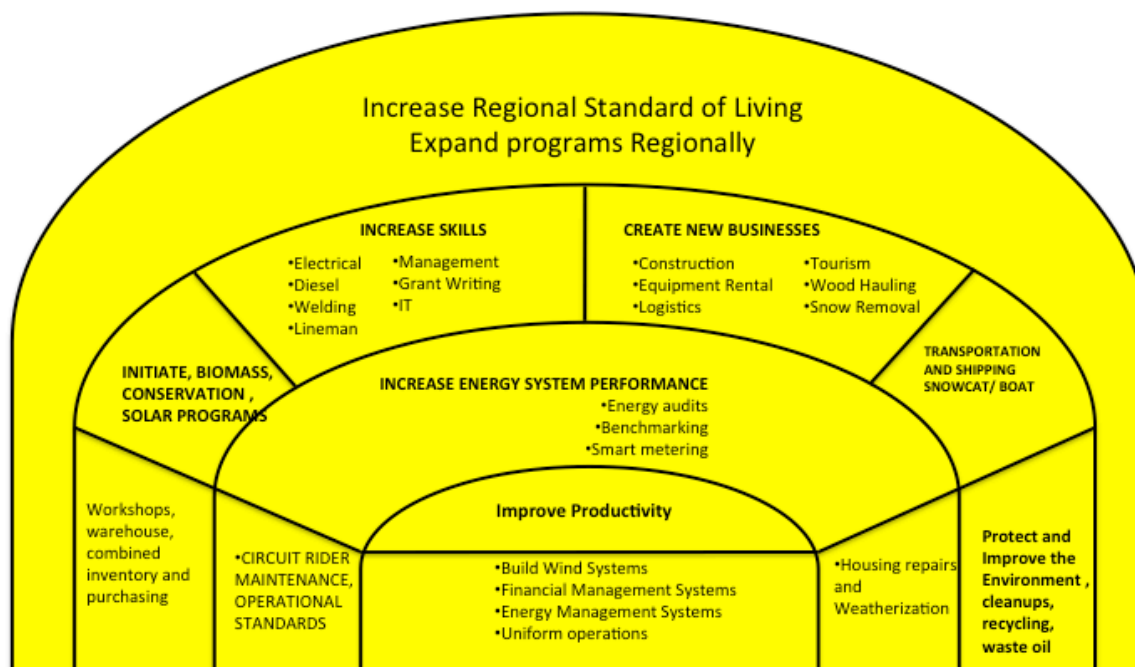
Now that Chaninik Wind Group has operating wind project systems built, the focus is to rebuild electrical distribution systems so that they are more reliable and can be used to increase the displacement of diesel fuel with wind. In addition to construction, programs must be put in place to monitor power generation and consumption, improve operations and maintenance routines, weatherization of residential and community buildings, conservation programs, utility planning, financial management and asset planning initiatives all need to be undertaken. These programs can only be addressed by a regional energy services collaborative.

In order to put the New CWG in context, the overall objectives expected from this business plan program are:

- The reduction of fossil fuels in CWG communities by 50% by 2025.
- To reduce energy costs by 25% below current levels by 2016.
- To create a minimum of 20 meaningful jobs by 2015.

To accomplish these objectives CWG will require \$875,000.00 to support program development over a three year period. These funds will fund phases 2 and 3 of the current pilot program as it transitions from informal project oriented support group, into a capable and self-reliant regional energy service collaborative. Funds will be used to purchase necessary equipment, pay for transitional administrative salaries, and build training programs. These activities and this level of support are needed to cultivate village based leadership and regional operational capacity needed for the organization to be sustainable. The total project cost is estimated to be \$3.2 million dollars. The sustainability of the CWG requires creating the managerial foundation for continued operational efficiency, economic growth and energy security. CWG's ambition of becoming the "heartbeat of the region" is expressed in three stages, and represented in the following diagram.

Chaninik Wind Group – Heartbeat of the Region
Energy Efficiency as a Strategy for Regional Development



The business plan is structured around three program areas:

1. Increasing effectiveness of all utilities
2. Increasing efficiency of energy services
3. Increasing the productivity of all systems

Central to the success of CWG is strengthening its leadership, management and operational skills. Experience has shown that to foster and sustain effective programs, CWG must be both viable and well-managed. Through a series of planning meetings, CWG's members indicated that the willingness of the member communities to fully support the collaborative operation is largely dependent on the confidence that CWG can be effective. This effectiveness depends on a variety of factors: such as the capability of the organization in carrying out its proposed programs, the riskiness of investing in the financial viability of the organization, the organization's capacity to establish effective quality controls, its ability to measure program performance, its skill in creating partnerships, attracting, training and supervising employees, and mobilizing resources for its activities, and above all, CWG's ability to provide various levels of administrative support.

This administrative and managerial support is essential for initiating and implementing any program or activity. It is clear that, at the community level, initiating and executing programs is beyond the resources of any single village utility program. This fact becomes increasingly more

evident as programs/projects increase in cost and complexity. In these instances, success requires capacity and cooperation.

A stronger, better organized CWG can tackle bigger, more costly and more complicated projects and in doing so access greater resources across a wider variety of energy and economic development programs. These types of projects create more sustainable communities by:

- Improving performance
- Customizing programs to fit village needs
- Accelerating the delivery of solutions
- Reducing dependency of fossil fuels
- Reducing energy costs
- Increasing the return on energy investments
- Creating new job training and employment opportunities

To reach its objectives, CWG needs assistance in three specific areas:

1. To develop operations, maintenance and management capability.
2. To improve basic infrastructure in the CWG communities to support efficient energy systems.
3. To create on-the-job training programs and policies to capture workforce development objectives within energy efficiency improvement projects.

The initial energy saving programs to be created by the CWG are:

1. Circuit Rider maintenance and training program
2. Electrical Distribution Construction
3. Multi-village weatherization

Program Area #1: Increasing Operational Effectiveness

Stand alone utility operators are being asked to keep costs low, dealing with unpredictable fuel costs, the growing complexity of diesel power systems, and no information or ability to plan for system upkeep or repairs. In many cases the infrastructure these individual managers have inherited is technically foreign and mostly inadequate or failing. The local utility managers are asked to oversee vital services with not enough staff, limited resources, and customers who have little capacity to pay. CWG intends to address these needs with programs in each development area of diesel power plant operations, utility operations, and utility management. The practical value of the CWG is to provide immediate and long-term help to operate diesel and wind diesel power plants more effectively. Effective management will result in high fuel efficiency, lower operating costs, and more reliable service. There are tremendous short-term and long-term cost savings to be had from improved operational effectiveness and management.

Increasing operational effectiveness is concerned with optimizing the performance of existing utility operations through projects and programs that will result in more efficient utility operations. These programs include: metering, financial management, power system

maintenance improvement programs, fuel management, personnel training, and technical support.

To be successful, CWG must show that as the result of its assistance, its member communities can see lower operating costs, increased reliability and more kilowatt hours sold per gallon of fuel used. Improving operational effectiveness will require CWG to demonstrate the technical and managerial competence to coordinate multi-utility asset management and utility planning programs across all its member communities. This will include assistance in: accounting, rate setting, preventative and scheduled maintenance, circuit rider assistance programs, personnel training and development, inventory management, asset repair and replacement, bulk fuel management, and power and distribution system upgrade programs. Additionally, the CWG must have the ability to identify, initiate and manage comprehensive multi-community energy efficiency projects that include: renewable energy systems, weatherization, conservation, lighting, efficient motors, and measures involving heating, ventilation and water treatment systems.

To meet the objective of improving operational effectiveness across all of its member utilities the CWG program will need to create 5 jobs.

These positions are:

- General manager or chief operating officer of the CWG
- An administrative assistant
- A project manager
- A program manager/development specialist
- A single circuit rider/trainer

Program Area #2: Increasing Energy Efficiency

There are many opportunities for increasing energy efficiency across each community. While this starts at the powerhouse, it extends to programs in each individual home and community building.

The most obvious program is rebuilding of electrical distribution. It is possible that this program alone could reduce overall utility fuel consumption by up to 5%.

The second most obvious opportunity is to customize weatherization programs to address specific local issues and incorporate every home in the community. Addressing the weatherization issues will require more market analysis. However, it is potentially the most important and valuable. In some communities many homes have been weatherized, or partially weatherized, but there is still a lot of work to be done. Take as a whole, this challenge can create a great number of jobs and reduce the cost of heating fuel across the community. Secondly, the electric thermal storage program, transportation and wood energy programs would be some of the first areas of focus.

Here is a list of proposed CWG energy efficiency programs that would create 15 new jobs:

1. Operations and management assistance through a Circuit Rider Program
2. Diesel engine generator rebuild program
3. Power plant operations and monitoring
4. Smart metering programs
5. Distribution system construction
6. Wind program
7. Expanded smart grid program
8. Energy storage program, thermal
9. Energy storage program, electrical
10. Weatherization
11. Photovoltaic electricity program
12. Solar hot water program
13. Conservation, lighting, building management and appliance improvement programs
14. Water and sewer system integration
15. Transportation
16. Wood and waste to energy program

Program Area #3: Increasing Productivity

Increasing Productivity is about expanding the skills and capabilities of the CWG to address larger issues and opportunities. For example: The CWG could, once it has acquired the capability, help other communities develop or rebuild their power systems or build and repair their electrical distribution systems. Other opportunities include expanding construction and transportation projects as those capabilities are developed. A somewhat larger potential may exist for environmental clean up. There are many buildings in each community and around the region which have been abandoned and represent threats to life and health. This is a potential growth area.

DEMAND FOR CWG SUPPORT SERVICES

There are many opportunities for CWG communities to lower energy costs, improve performance and create jobs. However this requires a great deal of knowledge and ability to connect the resources to needs. For example, CWG partnerships with businesses, local, tribal, state and federal programs are vital to its success. However, individual communities on their own are unable to find the programs, petition or apply for assistance and then execute the programs effectively. This makes the communities completely reliant on an outside assistance provider to seek them out. CWG must have its own capacity to connect with outside organizations and take advantage of the benefits they provide. This requires the development and support of a management and leadership structure that has the time, the authority and the ability to characterize its needs, access the help and then implement programs to get the job done. Currently that capacity is weak in CWG as a whole and, in essence, completely absent in the individual communities. Having the ability to align resources, focus efforts and execute

customized activities will enable CWG to bring a broad and continuing array of energy efficiency improvements to their member communities and to capture the value created by those improvements in the region.

Sample opportunities include:

- Development of a community energy plan
- Development of capital investment plans
- Energy load management
- Distribution system maintenance and construction
- Participation in weatherization and home improvement programs
- Transportation planning
- Diesel engine and power plant training
- Utility operations and planning
- Environmental clean-up
- Recycling of utility equipment
- Rebuilding of utility equipment
- Waste oil blending
- Combined fuel purchasing and fuel inventory management

Through its pilot project work, the Chaninik Wind Group has made real progress in lowering the energy costs in its member communities. Now it must consider how programs deal with a range of activities related to capacity building and creating plans/strategies for assuring continued sustainability when the first phase, the wind turbine phase, of the pilot project ends. These objectives of building capacity have immense lasting social value and CWG is uniquely positioned to make best use of the opportunities and resources at its disposal to create real and lasting value above and beyond available grants and assistance. Experience has shown, and CWG communities recognize, that by strengthening their ability to work together, their objectives can be accomplished and CWG can build sustainable energy systems for their region.

Funding will be used for CWG to develop programs that address the following issues:

- Funding to build CWG's management and leadership capabilities, tools, equipment, staff and infrastructure to support CWG members and representatives in their work.
- Cultivate relationships among community members, the organizational leadership and outside resources.
- Creating specific program objectives to ensure the success in terms of work plans, funding, resources and time.
- Creating enterprise units which will enable profitability after the pilot project is completed.

CWG PROGRAM PHASES

Current Status: Phase 1 Pilot Program

The CWG vision began as an idea in 2005 and took shape with the receipt of funding for wind turbines in the villages of Kongiganak, Tuntutuliak, Kipnuk, and Kwigillingok. The first wind

turbine began operation in Kongiganak in 2011 and comprehensive wind diesel projects in Kong, Tunt and Kwig will be on-line in Winter 2012. The efforts of the program have been directed at increasing the productivity of small individual energy systems by adding wind turbines to displace diesel fuel used for power generation. In order to increase the productivity of the wind systems, additional wind turbines were added to generate excess wind energy to be sold at special rates into electric thermal storage units located in residential homes throughout the community.

Phase 1 CWG programs have been focused on increasing the productivity of each village power system and include:

- Developed relationships with village utility managers and utility boards - through these relationships, communication networks in the community and among all stakeholders and partners (present and future) have been established
- Developed outreach plans to further the program and increase its visibility throughout the state and nation
- Conducted trainings for wind turbine technicians and provided support for advanced diesel system training
- Obtained funds to rebuild electrical distribution systems in Tuntutuliak, Kongiganak, and Kwigillingok
- Obtained funds for bulk fuel and power plant systems in Kipnuk
- Developed Phase 2 business plan
- Implemented wind projects
- Obtained funds from USDoE Tribal Energy Program to support Smart grid activities, including new community metering systems
- Made presentations on community activities, accomplishments, involvement and needs to state and federal program managers
- Worked with local reporters to have articles and radio reports on progress

Phase 2 program activities of the CWG management are focused on developing capacity to increasing the effectiveness and efficiency of all the energy systems.

This will be accomplished through the creation of primary programs:

- Leadership and Management Infrastructure
- Measurement and Monitoring of Performance
- Training Program
- Circuit Rider Maintenance Program
- Central Purchasing and Inventory Sharing
- Joint Operations Plans

Phase 3 of the business plan, follows through with program development and implementation. The end results are more efficient energy systems and the creation of jobs. As these objectives are accomplished, successful programs can be expanded to other communities and business opportunities throughout the region. This ultimately improves the overall economic performance of all the communities combined and is primarily focused on building new programs and creating jobs.

The initial steps for accomplishing these objectives should include:

- Lineman training and development program
- Weatherization program
- Home improvements
- Environmental cleanup program
- Recycling
- Transportation
- Construction
- Utility and community infrastructure development
- Expanding membership of CWG
- Regionally expanding scope of program

How to Get There

The Chaninik Wind Group must view its utility assets and any grant funds it receives as investments that are expected to yield results significantly beyond the funds provided. This business plan includes a variety of suggestions for achieving program sustainability, including the diversification of revenue sources, partnerships and collaborative strategies, organizational and community capacity building, and the strategic use of state and federal programs and community volunteers. Because the CWG business is designed to address critical local needs, it begins with immediate strategies for how projects and services will build on the specific activities supported by system improvement grants to the community.

Central to the on-going success of CWG is strengthening its leadership, management and operational skills. This process, already underway, is a process that helps a program or organization enhance its mission, strategy, skills, systems, infrastructure, and human resources to better serve community needs. To foster and sustain effective programs, the organization must be both viable and well-managed. Regardless of how imaginative a program's design may be, its effectiveness will be largely dependent on a variety of other factors, including the skill of the organization in implementing the program, its financial viability, its capacity to establish effective quality controls, its ability to measure program performance, its skill in creating partnerships and mobilizing volunteers and resources for its activities, and its ability to provide various forms of administrative support.

When funds are provided by the state to build wind systems, weatherize homes, or replace electrical distribution systems, some of those dollars are spent on local labor. Some of the funds for the wind and diesel portions of the projects were leveraged with workforce development programs to increase the local labor content and to ensure that when the projects were completed, the capacity to support the equipment was retained. Now that CWG has some construction and operating experience, CWG is requesting assistance to expand the experience developed on the wind projects into a more fully capable regional energy services collaborative. This collaborative would establish and operate a combined set of uniform program objectives to first improve the productivity of the wind systems, and then build upon that experience to further improve energy efficiency throughout the communities and create more highly skilled, higher wage jobs in

energy system construction. This will require that CWG strengthen its capabilities and expand its framework to create a new regional energy services company.

The construction of the wind systems marks the ending of the Phase 1 Pilot Program. This business plan describes the second and third phases of the project, and the funds and activities required.

Primary Phase 2 activities

Activity 1. Circuit Rider Program

Purpose: To provide technical assistance for village energy systems in the Bethel Region. CWG circuit rider maintenance programs have the potential to be funded from contracts with local utilities, the State of Alaska, and/or through other separate contracts.

CWG circuit riders work with local operators, clerks and managers who do the everyday work in each of their communities. Providing reliable, affordable electricity is essential to the economic well-being and quality of life for all of the nation's rural residents. The circuit rider program is intended to develop specific and concentrated assistance within the CWG utilities. The program includes providing leadership and trained personnel to assist each community in the monitoring, upgrading, expanding, operating and maintaining their community utility. The primary activity of the circuit riders will be to improve the technical operations of the utilities. Through contracting, CWG will assist individual village member electrical utility managers and staff with day-to-day operational, financial, and management problems. The assistance may be requested by the CEO of the Chaninik Wind Group operating under the direction of the board.

The intention is to grow regional technical assistance for the operations of CWG village diesel and wind diesel systems within the CWG group. The foundation of this program is the diesel generator sets and the wind turbines. There is no replacement for the diesel generator on the horizon. Each and every rural community relies on diesel generators for electricity. Diesel generated electricity can be supplemented by wind or solar power, or through conservation measures, but the diesel generator is the primary source of generation and is expected to remain that way for the foreseeable future. As fuel costs climb, diesel efficiency is becoming increasingly important and manufacturers are being forced to make engines more complex, more expensive and more difficult to service. Having in-region capacity to keep engines operating optimally, being able to conduct onsite overhauls, replacements and major repairs with CWG personnel will save as much as \$100,000 annually in operating expenses at each utility. Having highly trained and motivated diesel plant operators will require additional coaching, training and constant attention. This level of performance is beyond the capacity of stand-alone utilities. The program consists of hands-on operations and maintenance assistance to keep these gensets operating at their peak efficiency.

CWG would need to create customized programs for completing the training of existing staff to become certified for the construction of electrical distribution, transmission, and generation facilities. The local operators and utility personnel have by necessity learned to build and repair

their utility systems. However, since little of that experience has been documented and few employees have certifications, local talent is overlooked when important projects take place in the region. It is necessary to provide the training and proper equipment to local utility staff so that they can confidently make improvements, repairs and replace entire village distribution systems. This level of capability will be required to improve electrical services so that advanced demand side management, energy conservation programs, and on-grid and off-grid renewable energy systems can be built locally.

Recruitment And Management of Personnel

The CWG serves a combined population of nearly 2500 permanent residents in the lower Kuskokwim region. Community members are interrelated by social, cultural and economic ties. Utility managers in each of these communities have recognized the value of working together to obtain larger regional objectives. The CWG must grow its capabilities from the local workforce. While the communities need to agree about time horizons, the projects must include focus on development of a few central recruits who will represent the full range of capabilities that are needed by the communities.

These include:

- Credible community members you can count on to be there when needed
- Influential, well-known, and respected members of the community
- Strategic thinkers with excellent negotiating skills
- Board members, advisors, and engaged community partners/stakeholders
- Community members with talents in critical areas, i.e., power plant operations, electrical system construction, diesel generator repair, welding, wind turbine maintenance, and general construction

Activity 2. Electrical Distribution System Reconstruction

Funds have been received to rebuild electrical distribution systems in Kwigillingok, Kongiganak, and Tuntutuliak. It is anticipated that these same funds will be available for Kipnuk.

The capacity to build and repair electrical distribution in the region is a key asset.

Three CWG member villages have received a combined \$6,000,000 to construct new electrical distribution systems for their community. The CWG board members came together to apply for state funding. These organizations could not individually manage a construction program, but through collaboration can build a specialized training program and obtain specialized equipment that allows CWG as a group to build a shared member team to accomplish the goal of building powerline construction capability in the region. This capability requires the development of journeyman level linemen who would be located within the region and be able to train other village members in power line construction.

The CWG management must be involved in coordinating each community project, creating training programs and recruiting trainees from the local villages; organizing community assets, and sourcing equipment and resources to complete the work. This experience could easily be expanded to other villages in the region, as well as to construct electrical transmission lines

between villages. The first of these lines could be between the communities of Kongiganak and Kwigillingok or Kipnuk and Cherfornak.

This program is currently beyond the capabilities of any one single community, but would improve the reliability and efficiency of each village energy system. By enabling CWG to learn how to build these systems, CWG management learns to manage the projects, interface with training programs, engineering teams, develop skilled local labor and plan for the future.

Other communities with limited resources may find it beneficial to work with CWG to help them obtain funds and execute electrical distribution upgrade programs. This would grow CWG's membership levels.

While CWG leadership's time will be split between in-community goals and regional goals, building capacity to construct power-lines is probably the single most important source of potential income for CWG outside of day-to-day operations. This is an example of funds coming back to the community from outside projects that will result in lower energy costs. The results of this program can be expanded - reaching a greater distance across the region.

A program to build these systems can be created. Besides rebuilding of the distribution systems, the CWG could agree on a method of construction which would involve training opportunities to create journeyman electrical linemen as well as obtain the equipment and experience necessary to rebuild electrical distribution in the future.

Possible Scenarios:

- Recruit community based electrical system operators, and organizations to serve as partners to your organization.
- Construct communication networks among all your "stakeholders", i.e., all the parties involved in your program: participants, partners, beneficiaries, and other agencies in the community to let them know the intentions of CWG.
- Collect input from the community on the program's activities and expected results.
- Identify potential partners (other community organizations, businesses, government agencies, etc.) who share your goals.
- Convene meetings of partners and potential partners to discuss possible collaborative activities.
- Cultivate partner interest and involvement.
- Develop customized training programs to certify local staff in all aspects of the construction and operation of electrical distribution systems.

Activity 3. Weatherization

The CWG conducted initial energy use surveys of homes in candidate communities. These surveys indicated a great need for weatherization programs particularly in older homes. Funds are available for weatherization. However, it would be CWG's objective to quantify the needs very precisely and then obtain the funds to accelerate the execution of these programs in each village. It would be easy to expand these programs. Jobs would include: auditors, carpenters, house leveling, roofing, siding, insulation, windows, doors, wiring and appliance replacements.

This type of project could then lead to programs in photovoltaic and solar thermal heating systems.

CWG Activity and Job Program Opportunities

In order for CWG to grow, it must transition from the single project perspective of building wind turbines into an organization that can develop and implement a continuous stream of projects and programs that meet customer needs. This means that CWG must grow its managerial capability. The change CWG members must go through is to transform themselves from individual utilities on single missions to build wind projects into a process oriented team that is able to execute and support a larger more comprehensive mission of continuous energy efficiency. This, initially, requires important changes in the overall utility management and culture, and secondly in the creation of functional departments.

The partnership among the utilities is one of its key assets. When compared with single stand alone village utilities, CWG is the only organization in the region that has endeavored to develop the scale, relationships, the understanding of the issues, and to make the best use of opportunities for creating real and lasting change. The social and economic benefits of improving the efficiency and productivity of village energy systems are tremendous, but they are out of reach of stand alone utilities. By combining their efforts, the CWG communities have received funds to install wind systems and rebuild electrical distribution systems. It will require a combined effort to create customized in-village training opportunities for local technicians and to develop a shared support and administration network.

With proper planning and training, the funds acquired for rebuilding the electrical distribution systems within the CWG communities could be used to build the systems and simultaneously create up to 10 permanent village based jobs that would expand their scope of service throughout the region. Developing the capacity to locally operate new wind diesel systems, build power lines, and conduct energy efficiency upgrades will easily bring at least 20 jobs to the region, aside from the added benefit of increasing the capabilities of the local workforce.

Phase 3 Job Creation programs include:

- Diesel technicians, circuit rider program
- Wind turbine systems, circuit rider program
- Power line construction and maintenance program
- Utility management, circuit rider program
- Energy Information technology programs
- Energy storage systems programs
- Weatherization program
- Home improvement program
- Environmental cleanup program
- Recycling program
- Bioenergy program
- Transportation program
- Water and waste water programs

Phase 3 CWG management activities:

- Develop management and operational methods and implement continuous energy system efficiency programs.
- Orient and train staff, members, and volunteers in the skills and techniques for program implementation.
- Research and identify potential grant-making opportunities and other donor or contributory groups.
- Write and submit grant proposals to diverse sources for program funding.
- Prepare and implement a funding development strategy that includes a variety of approaches.
- Assess program needs and match them with appropriate training/trainer roles and skills.
- Develop training programs.
- Identify and create methods to engage existing village power systems employees.
- Prepare program materials, make presentations, and inform the community about the program.
- Recruit to play active roles in the program (and not just supply administrative support).
- Develop hiring and selection tools and procedures.
- Create a complete workforce development strategy that includes volunteer position descriptions, policies, and procedures.
- Design and implement a strategy to direct program efforts and energy into needed community services.
- Develop and carry out a plan for circuit rider orientation and training.
- Monitor, coordinate, and assess CWG performance.
- Provide feedback and skill development opportunities to local operators.
- Transfer responsibilities from consultants and support members to CWG staff.

CWG Building Summary

Phase	Goals	Deliverables
Phase 1		
1. Stabilize Management	Move CWG from wind turbine maintenance to collaborative operational model, with scalable development based on energy efficiency.	Written plan, which matches market requirements
a. Transition from wind systems to wind diesel systems	Build a circuit rider maintenance program for diesel generators, wind turbines, distribution, metering, and financial management	Write a market requirements, workforce development plan, and equipment and materials plan
b. Manage operations growth	Develop an operations and support management plan to match program objectives and market requirements	Written plan with scope of work, schedules, budgets and community support agreements

Phase 2

Review Management and Build a Collaborative Mission Centric Organization	Grow past the wind system development team	
The CWG Board establishes Executive Director and CWG executive staff	Evaluate current Board management; possible transition to new CWG building roles	Management team for building the CWG collaborative
Develop mission centric Organization and collaborative work culture	Evolve management from visionary to one that can scale to more villages and more personnel	Mission statement implementation agenda across CWG community projects
Develop staff capabilities	Create customized training programs, for diesel, wind, electrical distribution, metering and financial management	In-village training programs

Phase 3

Customer development team of utility managers creates functional departments	Set up functional departments that are mission driven	
a. Craft department mission statements	Establish mission driven goals for new departments	Departmental mission statements and measurable objectives
b. Define department roles	Define the department roles by Market type	Written departmental objectives, budgets, responsibilities that match market type
Build Fast-response Departments	Create agile and responsive departments that act as small startup business units	Purchase support equipment, computers, software, snow machines, four wheelers
a. Implement Mission-centric management	Build components of mission centric management,: aspirations, trust, communications, decision making, and mission synchronization	Mission-centric culture roll-out across departments
b. Create a culture for gathering and disseminating information	Departments with multiple views of information: first hand knowledge, overall	Written plan for acquiring the three views of markets and customers

	view, view through customer's eyes	
c. Build a leadership culture	Lead by delegation, build mission driven culture	Transition from individual utility operation to collaborative operation
d. Practice, iterate and grow	Verify that operational sales have become self supporting	Predictable performance, predictable revenue, and expense
	Management team that can grow and build CWG	Viable and sustainable business model, mission centric culture, executives, suited to mission.
	Build a circuit rider program	Train the full service level technicians in diesel generator sets, wind turbines, control systems, and financial management assistance
	Build programs in weatherization, transportation, and metering	Develop a grant writing, project administration and program management team in metering, weatherization and transportation.
	Build program in construction of electrical distribution systems	Multiyear construction program, to purchase equipment, and acquire the skills and experience to build electrical distribution systems
	Build programs in community development	Building utility support infrastructure

Cost of Project Phases

CWG's desire is to build a strong self-reliant and self-supporting network of village utilities. The managers of these utilities have long recognized that individually they lack the resources to make progress. Instead, by working together, it has been possible to build wind projects in each community. Funds are needed to build on these activities to implement coordinated regional activities.

The collaborative is a multi-community utility organization designed to support best practices, engage in joint activities and share resources to develop stronger community and regional economies. Working together the CWG has been able to accelerate access to the development of wind energy projects in each community. Organization and management capacity is needed to continue to provide development assistance, and enable member communities to improve their

energy efficiency, lower their energy costs, and grow new business opportunities. The following is a proposed 5-year business plan.

It is the intent of this funding to provide sufficient support so before the end of 5 years the CWG will be a fully sustainable, self-reliant organization. Support is needed to build the management and operations infrastructure that includes nurturing regional leadership. The benefits of membership in CWG will be measured in higher quality, lower cost energy services, fossil fuel displacement and job creation.

With additional complexities of operating and maintaining the new energy systems, the CWG Board of Directors clearly realized the need to build local capacity to secure long-term energy cost savings for their communities. The potential benefits depend on collaboration among utilities, training, technical and managerial support, adequate operations, maintenance, and prudent financial management. The CWG Board of Directors, representatives of the member communities, in collaboration with IES and researchers at the University of Alaska Anchorage's Institute of Social and Economic Research (ISER) developed this pilot program business plan that focuses on building the necessary local support structure to secure long-term benefits from renewable energy investments to the communities. Business planning was achieved with assistance from the Denali Commission.

ISER's 2003 research into the effective management, maintenance, and operation of sustainable utilities in Alaska¹ identified the need for funding that provides organizational development in conjunction with capital projects. In this context, effective organizations require organizational capability to be developed in four primary areas:

Board Capability

The ability to attract and retain Boards who work together to provide insight and assistance to managers to attract people and capital to the enterprise and understand the needs of customers.

Management Capability

The ability to attract and retain experienced managers with a track record of building successful teams who meet or exceed financial, public health, safety, and environmental goals.

Technical Capability

The ability to attract and retain experienced operators with a track record of successful performance in meeting or exceeding safe, reliable service standards and achieving compliance with government regulations such as emission standards

Financial Capability

The ability to attract and retain experienced administrators, bookkeepers, accountants, financial officers, and lobbyists with a track record of successful performance in meeting or exceeding financial goals.

¹ Colt et al. (2003)

Interesting to note, the ISER (2003) research found that a common reason why utilities improved over time, was due to an expanded role of women in the management of utilities that leads to significant improvements in performance.

Funding to Build Capacity

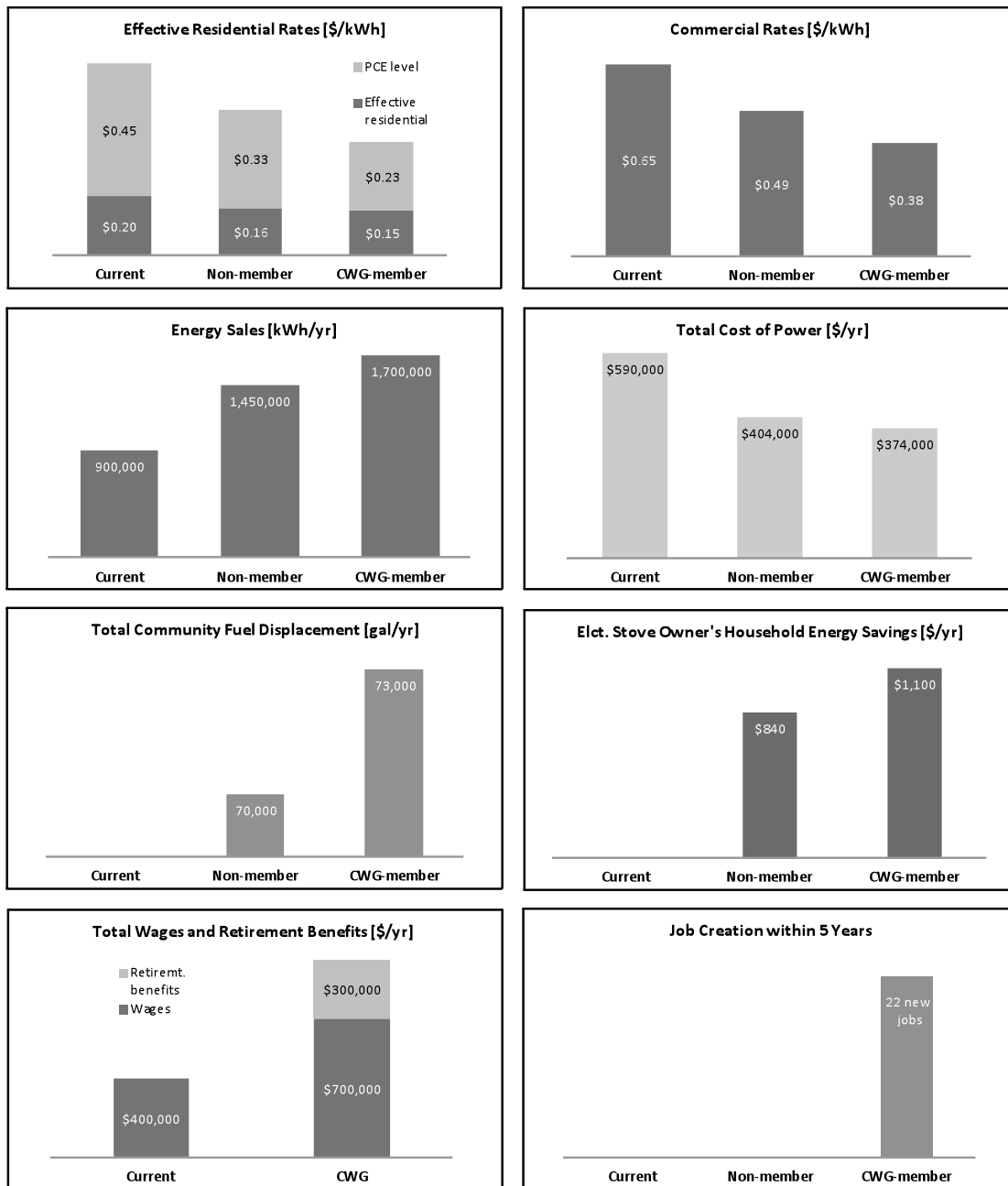
The pilot project assistance will be used to support administrative and managerial functions required to improve power system performance, and develop work force, energy efficiency and enterprise programs. The pilot project will build on the work already accomplished by CWG.

The proposed three year budget is \$3,200,000. This is the overall budget needed to provide equipment, personnel, training and operating costs for the collaborative operation of four utilities for the current community members. It is anticipated that this level of project funding will be derived from a number of outside sources. After 3 years of operation, it is anticipated the organization will grow in membership and start to be financially self-reliant in year four. The proposed organization will ensure prudent and preventative maintenance, efficient operations, and protect the investment of the installed wind-diesel hybrid systems. In addition, the proposed institution will expand and invest in local human capital resulting in regional economic development opportunities. By offering local job prospects and reducing fuel purchases, a larger share of income will circulate in the communities CWG serves, further expanding economic development opportunities. CWG will serve as a model for other small independent village utilities.

A study by University of Alaska Anchorage (UAA), Institute of Social and Economic Research (ISER) estimates the following benefits associated with a fully functional CWG:

	Current	Non-member	CWG-member
Rates [\$/kWh]			
<i>Commercial</i>	\$ 0.65	\$ 0.49	\$ 0.38
<i>Effective residential</i>	\$ 0.20	\$ 0.16	\$ 0.15
<i>PCE level</i>	\$ 0.45	\$ 0.33	\$ 0.23
Cost of power [\$/yr]	\$ 590,000	\$ 404,000	\$ 374,000
Energy sales [kWh/yr]	900,000	1,450,000	1,700,000
Community fuel displacement [gal/yr]		70,000	73,000
Stove owner energy cost savings [\$/yr]		\$ 840	\$ 1,100
Wages & retirement benefits [\$/yr]	\$ 400,000	\$ 400,000	\$ 1,000,000
Jobs created			22

(categories are current diesel only utility, potential wind-diesel utility and potential wind-diesel utility that benefits from CWG membership)



The New CWG and Sources of Funding

Cultural integrity and self-determination are essential elements for successfully addressing the challenges stand alone electric utilities face in rural Alaska. In 1999, the Alaska Commission on Rural Governance and Empowerment in its report to the governor echoed the need for self-governance and stated:

“Little time or money was spent on supporting the village’s innate capacity to take care of itself. Accordingly, local authority and responsibility for decisions had been usurped; Native people had lost control of their own communities and of their children’s lives. The assumption that people cannot do for themselves, if continued long enough, becomes a self-fulfilling prophecy (p. 22).”

Such past approaches fail to address the necessary building of community-based leadership and management capacity needed for sustainable utilities in rural Alaska.

A primary objective of CWG is to create an organizational foundation for leadership to develop, so that the stated objectives of self-reliance and self-determination can become a reality. This business plan creates thrust for pilot program funding to create and operate the collaborative.

Potential Sources of Revenue

Members of the CWG working group agreed to set annual membership fees for each village assuming that CWG can provide all of the proposed services. No membership will be charged during the pilot program phase. Member utilities will have exclusive access to the following services:

Phase 1:

- CWG Administrative Support Program
- Metering and financial performance measurement program
- Circuit rider program

Phase 2:

- Logistics and purchasing programs
- Safety and productivity training
- Workforce development program
- Energy management program
- Weatherization program

Phase 3:

- Equipment and materials warehousing
- Distribution line reconstruction program
- Transportation program
- Diesel generator rebuilding program
- Wood energy program
- Solar energy program
- Recycling program
- Environmental clean-up program

The following sections outline three different product categories that the CWG working group participants feel have market potential in the region. Some of these services will exclusively be available to CWG’s members and are described in the membership section below. Other products to be sold to non-member communities are explained in the energy services sections, followed by a description of CWG subsidiaries. CWG working group participants thought that

construction and environmental cleanup as well as a transportation business could further diversify CWG's income stream and lead to more long-term self-reliance.

Basic Member Access Programs:

- Centralized purchasing and inventory system - Standardized operating systems will allow CWG to purchase spare parts in bulk and negotiate lower prices. In addition, CWG will have a complete inventory of supplies and spare parts near the villages for immediate use in case of emergencies. This will reduce the cost associated with power outages from equipment failures.

Based on the experience of the Alaska Rural Utilities Service central supply purchasing program, we estimate that CWG will be able to negotiate prices for supplies and spare parts that are 15% less expensive than if its member village utilities purchased these supplies individually. The village utilities will realize 5% of these savings which leaves CWG with 10% to cover the cost of operating the central purchasing and warehouse program.

CWG will develop an inventory tracking and management system and train CWG personnel to use the system to help member utilities order parts and maintain spare parts lists. Further analysis is required to research the feasibility of a local supply and inventory system.

- Local workforce development program - Create local job training curriculum for wind-diesel mechanics and linemen. The local operator training will be linked with a circuit rider program focused on continuous quality of service improvements.
- Monitoring and data management services - Implement proper monitoring and data management to systematically optimize the energy systems and further improve efficiency. This part of CWG will be managed by a professional IT specialist.
- Billing services - Develop a billing system for excess electricity utilized for heat. The smart grid system and metering equipment will automate this process and reduce additional administrative costs.

The price for selling excess electricity for heat will be indexed to the cost of heating fuel but not be lower than the cost of power production from wind plus a stove owner surcharge. A cost analysis of wind-diesel operations in Alaska was conducted for this business plan. The estimated cost of electricity production from wind is 9 cents per kWh, which sets the minimum price per kWh for heat per kWh. The maximum rate for heat could be determined by the avoided cost for stove oil, which at a stove oil price of \$5.55 per gallon and 85% efficiency for direct vent heaters, is equal to 16 cents per kWh.

A yet to be determined surcharge will be assessed on stove owners who received stoves purchased with grant funds. Assessment proceeds will be placed into a ceramic stove reinvestment fund. The reinvestment fund will be used to help offset the prices paid by households who did not receive electric stoves funded by grants. A fair stove owner surcharge will be determined that is equivalent to the up-front share of capital investment required by future stove owners. Thus, the initial capital cost

for additional electric stoves would be shared by current stove owners who initially received stoves free of charge but paid into the stove reinvestment fund and by future stove owners equally.

- Weatherization and energy efficiency programs - Administer local weatherization and energy efficiency programs benefitting utility customers.

Energy Services

In addition to the services accessible exclusively to CWG member utilities, CWG will diversify its business and income potential with the following small business ventures.

- Product sales - CWG would become a representative for some energy saving products that would be made available to communities. This would integrate into their energy systems. We assume a stove mark up of approximately 20%.
- Metering/Billing Services - CWG will deploy common metering systems that are part of its smart grids. The systems are automated to simplify the work of administrative personnel in filing PCE reports, billing, and meter reading. These services improve the financial management of electric utilities and lower the accounting and auditing costs.
The recommended smart meter fee is set at approximately \$15 per meter per month for residential and \$30 per meter per month for commercial customers. This fee was determined by the CWG working group and IES. PCE reporting services were established to cost \$300.

One of the most pressing problems for rural communities is managing water and sewer systems. The smart grid technology CWG deploys will provide metering of electricity, fuel usage, and water usage at water production facilities. The CWG communities will automate the data collection to better understand water usage, and reduce utility costs.

It is estimated that setting up this system will require two months to organize.

- Demand side management services - The smart grid technology is capable of demand-side management when upgraded. This program will include development of a customer web portal for home-based, automated bill pre-pay and energy consumption monitoring. Local utilities alone cannot make their energy systems most efficient; customers also need to understand their individual and collective roles in the generation and use of power. These demand-side management tools will enable this type of customer engagement.
- Grant Management services - Attendees at the CWG working sessions found that there is an unmet need for grant management in rural communities. CWG could provide services applying for grants, some of which may be non-energy related. It is assumed that the average grant managed by CWG will be less than \$100,000. Grant writing and administration costs are normally covered by overhead charges. Most agencies that make grants limit overhead charged to 25% or less. In cases of grants exceeding \$100,000, the overhead charged would be 10% or less on the amount over \$100,000.

CWG Subsidiaries

In addition to energy products, CWG working group participants also want to diversify to be more financially sustainable and take advantage of other economic and business development

opportunities in Western Alaska. The following CWG subsidiary businesses are being developed.

- Construction services - Significant development of wind energy in villages is currently occurring. Opportunities for utilizing construction equipment and local workforce exist for additional wind turbine installations, the reconstruction and management of distribution system upgrades, and environmental cleanup. The envisioned construction services business is expected to employ more than seven seasonal workers and will be managed by a local project manager.
- Transportation services - During construction of the wind turbines in three of the four villages, CWG deployed a winter transportation system using a tractor hauling two sleds each with a capacity of 20,000 pounds. CWG utilized the tractor to get construction equipment and supplies from Bethel to the communities using existing winter trails. Due to the availability of the tractor, CWG did not rely on weather dependent and expensive air-delivery or much less frequent barge delivery. The tractor allowed the construction schedule for CWG to be more flexible and efficient.

With the uncertain future of bypass mail service, the CWG working group foresees good business opportunities for expanding this transportation business. CWG already has potential customers for the service. The estimated costs are substantially less than air delivery rates of over 80 cents per pound. The transportation business serves as an important subsidiary to diversify CWG's future financial health. It will employ two drivers and an administrative assistant managing orders and deliveries.

- Waste oil management services - Waste oil is a continued issue for rural diesel utilities. Often, communities do not have proper disposal systems for waste oil from diesel generators. CWG will investigate developing a program for proper waste oil disposal. This business will depend on economies of scale to justify investment.
- Wind Turbine Installation and Maintenance Services - CWG technicians have installed and developed expertise at maintaining wind turbines. These machines are rugged and proven and are expected to provide many years of service. Based on that construction and operational experience, local technicians have developed a great deal of on the job knowhow. CWG crews can obtain certifications for the installation, maintenance and operation of wind turbines and apply their skills across the region and the state. As oil prices continue to increase, wind energy systems will become more and more common and more valuable. Wind turbine service and maintenance could be a potential business opportunity to further diversify and strengthen CWG's long-term financial health.
- Other business opportunities - The CWG working group found the following unmet community needs that could be served by additional CWG business ventures. These opportunities include: snow removal services and school transportation in Kongiganak.

OPERATING COST ESTIMATE FOR CWG SUPPORT SERVICES

Greater reliance on energy efficiency and wind-diesel systems to meet future energy needs entails risks. As part of this project, energy economists at ISER developed a computer model in the attempt to quantify these risks. The Isolated Renewable Economic Simulator (IRECOS) is an economic model that is able to simulate the variability in renewable energy such as wind speed and other uncertain events such as the occurrence of power outages. The IRECOS model serves as a simplified representation of a utility's average hourly wind-diesel generation and a community's average hourly electricity demand and models the dispatchable heat load as well as heat demand for an entire year.

The following data sources were used. First, ISER collected current cost and revenue information through interviews with utility personnel in CWG communities and historic PCE records. Second, together with IES, ISER developed detailed maintenance and replacement protocols that outline labor costs and costs for parts and freight associated with prudent operation, maintenance, repair, and replacement of the wind-diesel smart grid systems. Third, ISER utilized wind speed data collected for Kongiganak. Fourth, the analysts applied generator specific fuel consumption data available through the Alaska Energy Authority and utilized a power curve provided by the manufacturer to calculate the amount of power generated by the Windmatic 17S wind turbine.

The average hourly wind speed serves as the most important input to the IRECOS model and is used to calculate outputs such as the amount of diesel fuel consumed or amount of residential stove oil displaced. The computer program uses 1,000 different possible values for each input to calculate 1,000 different possible values for each output, thus testing a wide range of assumptions. In order to show the most meaningful results for this business plan, the analysts decided to show the average of the 1,000 possible results IRECOS calculated for each output variable.

IRECOS was run for four cases: 1) current diesel operations, 2) future wind-diesel operations while not being a member of CWG, 3) future wind-diesel operations while being a member of the CWG pilot program, and 4) future wind-diesel operations while being a member of the self-reliant CWG program. The results shown below are based on Tuntutuliak, Kwigillingok, and Kongiganak, all of which have similar costs.

Important assumptions

	Current	Non-Member	Member CWG-pilot	Member CWG
Diesel generators	2 JD 6090 (250kW each)	2 JD 6090 (250kW each)	2 JD 6090 (250kW each)	2 JD 6090 (250kW each)
Wind generators	None	5 wind turbines (100kW each)	5 wind turbines (100kW each)	5 wind turbines (100kW each)
Residential thermal stoves	None	30 (180kW)	30 (180kW)	30 (180kW)

Community electric boilers	None	Unlimited capacity	Unlimited capacity	Unlimited capacity
Circuit rider	None	None	2 circuit riders	2 circuit riders
Local training and certification	None	None	Operators, linemen, managerial	Operators, linemen, managerial
Reliability of system	Low	Low	High	High
Probability of outage	20%	20%	5%	5%
Access to centralized purchasing & supply center	No	No	Yes	Yes
Average length of outage	Likely more than 1 day	Likely more than 1 day	Likely less than 1 day	Likely less than 1 day
Business income through energy services and CWG subsidiaries	None	None	Initial earnings in year 3	Leverages costs of CWG overhead and staff positions to keep electric rates low

How is reliability modeled?

No data is currently available on the frequency of occurrence or duration of source of power outages, or the availability of generation equipment in each community. Power outages and out of service generation equipment is currently commonplace in each of the CWG communities. Generators may be down for months at a time due to a parts failure, lack of funding or other maintenance issue. Power outages occur in every village, just about every month of the year. Winter outages threaten the public safety and can be responsible for the freeze up of critical infrastructure that results in very expensive repairs. In the summertime, outages can have longer term consequences, as subsistence foods thaw out when the local grid is unable to power freezers.

Typically outages last for minutes, but in some circumstances an entire community can be without power for hours, and sometimes days. Extended periods of limited power production can cause rationing. Since no recording equipment made reasonable assumptions, this is based on anecdotal information. We modeled the occurrence of an outage and kept the length of an outage at one day for all four cases. Since non-member utilities would have to order spare parts from outside the region, the length of outages in the non-member case are likely longer than in the CWG case. To compensate for this difference, we assumed the non-member case would have the

same probability as current outage rates while the CWG member case would have slightly lower probability of an outage.²

How are energy cost savings calculated?

We assume each household consumes:

500kWh in electricity per month

800 gallons of stove oil (not owning a thermal stove)

Retail price of stove oil is \$5.55/gallon.

How is PCE calculated?

Currently, the PCE level is calculated based on average cost, calculated as total eligible cost of power production divided by total amount of electricity delivered. If we apply the current PCE formula to utilities with significant electric heat sales, the community would be faced with a drastic decrease in their PCE level, from currently 45 cents/kWh down to 6 cents/kWh for CWG communities. This decrease is in part driven by the structure of the PCE formula that is based on the assumption that all kWh are generated with diesel and are applied to the electric load. The PCE formula needs to be adjusted to more accurately account for fuel costs with systems that have integrated renewable energy generation. In addition to the formula structure, there are two reasons for the decrease in the PCE level. First, with the addition of wind, the cost of power production decreases and second, the amount of electricity generated increases, both leading to a decrease in average cost.

The results presented here use a modified PCE formula, NOT the current formula. For the purpose of this business plan, we calculate PCE levels solely based on the kWhs of electricity delivered, excluding the kWhs used for heating.

In order to receive the PCE level as calculated in this business plan, CWG must work with legislators to correct the PCE formula to adequately account for the heat sold in CWG communities. The analysis and results shown here assume that this effort is successful.

Objectives

This business plan proposes a three year pilot program to develop a self sustaining utility collaborative in the Bethel Region. The purpose of this organization is to combine resources scattered across multiple villages to create a reliable and sustainable organization. To be self-sufficient, CWG must provide continuing benefits to the electric utilities in its member communities. The working group established the following customer service and strategic business objectives:

Customer Service Objectives

- Reduce energy costs for communities and residents.
- Provide services that lower energy costs, increase system efficiency, and improve the quality of service by establishing local skill training programs. The quality of service is measured in increased

² The shipping of spare parts during outage is currently a frequently observed fact in the communities. It not only adds costs for expedited shipping charges, it also adds time to the length of an outage, often resulting in outages that are several days long.

efficiency, reduced number and duration of outages, higher collection rates, lower overall costs, and greater access to resources.

- Install more stoves and wind turbines to expand benefits from heat generated with renewable energy.
- Establish local weatherization and energy efficiency programs.

Strategic Business Objectives

- Effective representation of local rural Alaska community interests in the government process.
- Self-governance
- Develop and maintain industry partnerships (suppliers, funding assistance)
- Create and retain local capacity by providing better wages and retirement benefits to employees. Provide additional administrative and operational staffing to support growth and efficient delivery of services.
- Invest in energy efficiency and demand-side management to reduce future capital costs.
- Diversify CWG's business capabilities to increase income stability and self-reliance.
- Engage in long-term planning, including integrated resource planning.
- Develop trust and reliability for all customers, particularly key customers such as schools, to avoid the need to invest in back-up generation.

After the pilot program period, CWG is financially self-supporting and has the ability to address local social, economic and technical concerns. Prudent financial management and accounting practices are essential.

Program Evaluation

To track its progress, CWG will monitor the following “metrics of success”:

- 1) Income versus expenses on a monthly, quarterly and yearly basis
- 2) Kilowatt hours sold, versus Kilowatt hours generated, daily, weekly, monthly, quarterly, yearly
- 3) Generation efficiency in kWhrs generated per gallon (kWhr/gallon)
- 4) Production efficiency in kWhrs generated per gallon (kWhr sold/gallon)
- 5) Wind turbine production by turbine by month
- 6) Kilowatt hours sold as electricity
- 7) Kilowatt hours sold as heat
- 8) Number, frequency and duration of outages, monthly, quarterly, and yearly
- 9) Lost revenues due to outages
- 10) Collections as a percentage of billing
- 11) Average residential customer bill after PCE
- 12) Diesel plant availability
- 13) Estimated fuel saving from base year for power generation
- 14) Estimated fuel saving from base year for wind heat sales

Results

	Current diesel	Non-member wind-diesel	Member CWG-pilot wind-diesel	Member CWG wind-diesel
Utility rates	\$ 0.65	\$ 0.49	\$ 0.37	\$ 0.38
Electric rate [\$/kWh]	\$ 0.65	\$ 0.49	\$ 0.37	\$ 0.38
PCE level [\$/kWh]	\$ 0.45	\$ 0.33	\$ 0.21	\$ 0.23
Effective residential (incl. PCE)	\$ 0.20	\$ 0.16	\$ 0.15	\$ 0.15
Heat rate [\$/kWh]		\$ 0.09	\$ 0.09	\$ 0.09
Utility energy sales	900,000	1,450,000	1,700,000	1,700,000
Electricity [kWh/yr]	900,000	680,000	760,000	760,000
Heat [kWh/yr]	0	770,000	940,000	940,000
Utility income	\$ 590,000	\$ 404,000	\$ 364,000	\$ 374,000
Electricity sales [\$/yr]	\$ 590,000	\$ 335,000	\$ 280,000	\$ 290,000
Heat sales [\$/yr]	\$ -	\$ 69,000	\$ 85,000	\$ 85,000
Utility cost	\$ 590,000	\$ 404,000	\$ 364,000	\$ 374,000
Personnel	\$ 100,000	\$ 120,000	\$ 84,000	\$ 84,000
Outside help	\$ -	\$ 20,000	\$ -	\$ -
Operators	\$ 45,000	\$ 45,000	\$ 60,000	\$ 60,000
Clerk	\$ 55,000	\$ 55,000	\$ 24,000	\$ 24,000
Fuel	\$ 430,000	\$ 220,000	\$ 210,000	\$ 210,000
2011 price [\$/gal]	\$ 4.55	\$ 4.55	\$ 4.32	\$ 4.32
Fuel [gal]	90,000	45,000	46,000	46,000
Non-fuel	\$ 20,000	\$ 30,000	\$ 60,000	\$ 70,000
Parts	\$ 20,000	\$ 30,000	\$ 60,000	\$ 60,000
CWG membership ^a				\$ 10,000
Administrative	\$ 40,000	\$ 40,000	\$ 10,000	\$ 10,000
Community fuel displacement	0	70,000	73,000	73,000
Generation [gal]		47,000	46,000	46,000
Residential heating fuel [gal]		7,000	8,000	8,000
Community boiler fuel [gal]		16,000	19,000	19,000
Household energy cost savings	0	\$ 840	\$ 1,100	\$ 1,100
Electricity [\$/yr]		\$ 240	\$ 300	\$ 300
Heating [\$/yr]		\$ 600	\$ 800	\$ 800
Employee benefits^c	\$ 400,000	\$ 400,000	\$ 780,000	\$ 1,000,000
Wages	\$ 400,000	\$ 400,000	\$ 570,000	\$ 700,000
Benefits	\$ -	\$ -	\$ 210,000	\$ 300,000
Job creation^d	0	0	17	22
CWG support jobs			7	7
CWG transportation jobs			3	5
CWG construction jobs			7	10

Notes:

- a) Membership fee depends on income associated with other CWG business ventures.
- b) PCE levels based on total cost of power and electricity supplied, not including kWhs sold as heat.
Under the current PCE formula, which does not differentiate between electricity and heat, PCE levels would be:
Non-member: \$0.12/kWh
CWG-pilot: \$0.06/kWh
CWG: \$0.09/kWh
- c) Includes benefits and wages paid to utility operators, community liaison officers, and CWG staff.
- d) Approximate job creation shown as total for all four communities.

Quantified Member Benefits

- 1) *Reduce commercial rates* - CWG member utilities can lower rates by 28 cents from 65 cents to 37 cents/kWh, whereas non-member utilities can drop rates by only by 20 cents/kWh.
- 2) *Lower effective residential rate to 15 cents* - For residential customers consuming less than 500kWh per month, the effective electric rate can be reduced by 5 cents from 20 cents to 15 cents/kWh.
- 3) *Increase energy sales* - Reliability pays off with about 17% more kWh sales. CWG members sell 1.7 MWh whereas non-members sell 1.4 MWh per year. With the potentially higher collection rates with CWG billing services, the difference could be larger. More energy sales can result in distributing more thermal stoves and use of plug-in vehicles.
- 4) *Lower operating costs* - Compared to non-members, CWG members realize savings in administrative and management costs, fuel costs, and rely less on outside contractors. These cost savings allow CWG member utilities to spend more on necessary O&M and pay their operators and clerks higher wages while providing employee benefits. Accounting for increased investments in O&M and employee benefits, CWG member utilities still operate at lower cost compared to non-member utilities.
- 5) *Lower heating bills* - We estimate that residents in CWG communities will realize about 30% more in energy savings compared to their counterparts in non-member communities.
- 6) *Higher wages and benefits* - Given CWG achieves financial sustainability beyond the pilot phase, CWG and its member utilities are anticipated to spend more than \$380,000 per year in additional wages, retirement plans, and paid vacation to their employees. Compensation pay scales will be based on qualifications, seniority, and performance.
- 7) *Create new jobs in CWG communities* - The CWG will create 12 to 22 new jobs in CWG communities. These include administrative positions and in CWG subsidiary businesses such as the winter transportation and construction business. The latter jobs are more seasonal compared to the year-round CWG staff positions.
- 8) *Increased self-reliance* - We estimate that PCE levels could range between 21 and 23 cents/kWh in CWG communities. This potential PCE level would cut the state's current PCE subsidy in CWG communities in half. In 2010, the combined PCE subsidy to the communities of Tuntutuliak, Kwigillingok, and Kongiganak equaled \$330,000.

Non-Quantified Member Benefits

Utility benefits

1) *Improved efficiency and reliability* - A locally based circuit rider assistance program, combined with operational oversight will result in improved operating efficiency, reduced downtime and few outages. These benefits will be captured in metrics such as: kWhr/gallon generated, kWhrs/gallon sold, number and duration of outages, increased local employment and reduction of emergency services from outside of the region.

2) *Onsite training / workforce development* - Investing in workforce development will improve productivity, system reliability, and create additional business and economic development opportunities in the region.

3) *Stronger financial footing* - CWG will have access to electrical production, consumption and billing data. This data along with the metering and billing capabilities of the metering system will improve collections, simplify administrative and provide information for improved management.

4) *Certified work force* - Utility operators will be able to receive local training on their equipment and certification for utility specific generation equipment.

5) *Worker's safety* - Improved worker rights and opportunities. Health and safety issues are a concern for the village workforce in the energy and electrical sector. Workers are regularly subjected to severe weather conditions in a dangerous operating environment including working with hazards related to the electrical generating plant.

6) *Increased purchasing power* - More purchasing power for fuel and parts purchases. E.g. paying for fuel upfront and one CWG entity reduces the perceived risk for the fuel sellers and results in lower prices. It is a win-win-situation for the fuel seller and the utilities.

7) *Access to private/public partnerships* - With uncertainties in regards to long-term fiscal health of state and federal governments, private and public partnerships are increasingly important. However, these partnerships need to be developed and nursed in order to improve accessibility to capital. CWG will have the manpower and experience to engage in relationship building.

8) *Ability to plan and establish long-term goals* - Operations and maintenance planning will enable each member community to plan for changes in their system requirements.

9) *Asset management* - Automated monitoring of generating equipment and the distribution system will allow for asset management leading to improved performance of the entire energy system and optimized investments that reduce the risk of component failure.

Community benefits

1) *Self-governance and local empowerment* - CWG will be a locally operated organization with a strong village-based approach to solving rural energy issues while providing community development.

2) *Stronger local economic base* - Most of the money spent on energy currently leaves the villages. Some of the energy cost savings are re-circulated in form of income to local residents.

3) *More stably priced energy over the long-term* - Less reliance on fossil fuel and the long-term reduction of fuel storage costs also means less reliance on fuel loans for purchasing fuel.

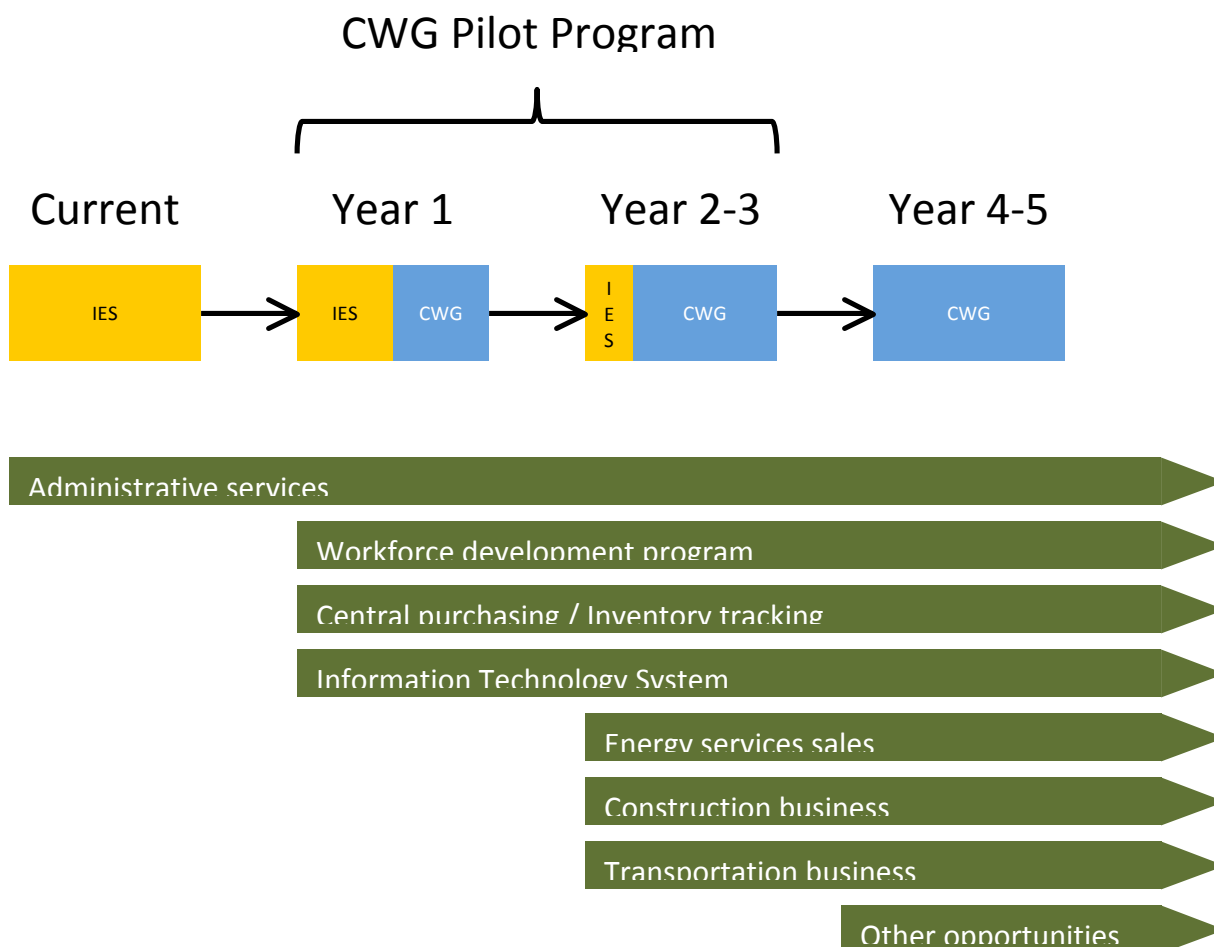
4) *Increased community self-reliance* - CWG and its subsidiary businesses could serve unmet community needs and provide important community development support, for example:

-Access to programs and grant money through expert networks

- Providing an interface between communities and agencies (e.g. energy efficiency, small business programs)
- Small business leadership support
- Further training and workforce development in other areas (construction, transportation, environmental cleanup)
- Having one voice and being heard
- Lobby the Alaska Legislature for policy changes that keep up with innovation and technology benefitting current and future CWG member communities.

CWG STRATEGY AND IMPLEMENTATION

Currently, Intelligent Energy Services (IES) is responsible for the completion of constructing the energy systems in each of the four communities. IES also assisted with business planning, administrative work, engineering services, and new business development. This business plan shows how responsibility will gradually shift to CWG to provide a long-term support organization for the utilities. The phasing of this transition is shown below. The three year pilot program will transition CWG towards achieving self-reliance in year 4.



We structure the CWG pilot program into three phases with associated focus areas:

Year 1 – CWG and IES share responsibility for CWG businesses

- Develop workforce development program
- Establish circuit rider program
- Start centralized purchasing center with inventory tracking system
- Provide ongoing administrative services

Year 2 and 3 – Primary business responsibility is with CWG, IES remains in a supportive role:

- Implement workforce development, circuit rider program, and energy services
- Establish energy services programs
- Develop CWG subsidiary businesses such as transportation and construction businesses
- Provide ongoing administrative services

Year 4 – All responsibilities transitioned to CWG
Implement transportation and construction businesses
Develop other CWG business opportunities

Year One Work Plan

In year one of the pilot program, CWG will hire a CEO and establish central offices and bylaws governing CWG business operations. Position descriptions will be written for all CWG positions and staff hired. The focus in year one will be workforce development and the establishment of a circuit rider program.

Create Workforce Development Programs

In order to keep their energy systems operating, CWG communities will need a host of services. Some of these will be a continuation of current services, but many will be new services for the newly installed wind-diesel hybrid and smart grid systems. Diesel and wind generators need tuning and periodic maintenance to operate at peak efficiency. Distribution systems need to be monitored and maintained. Accounting and inventory systems need to stay abreast of costs and income. Periodically all systems need to be overhauled. In the past, CWG communities relied on whatever skills their particular village had available and when other skills were needed they hired specialists from outside the community. Training will develop more local skills and reduce the amount of money communities will spend on outside specialists. Working together will allow communities to draw on more local specialists.

Training programs need to also provide training to improve and re-skill in areas such as advanced diesel maintenance, power line construction, electrical, wind, solar, advanced controls and communications systems, as well as energy storage and software.

The workforce development program will be targeted in three areas:

- 1) CWG capacity building
- 2) Managerial training
- 3) Operational training and skill building

The CEO will identify specialists to serve as circuit riders, one for diesel generators and one for wind turbines. This team of three will establish a circuit rider schedule and operator training curriculum. The CEO will report periodically to the board on:

- The selection and terms of circuit rider contracts
- Scheduling of circuit rider program and workforce training
- Coordination of the circuit rider program with local training, external training, and centralized purchasing and inventory
- Provide semi-annual reports on how the training program is achieving its goals based on the metrics of success listed above.

Goal: Improve operations and increase local capacity to maintain and repair the wind-diesel and transmission systems, accounting and collections, and smart grid and information technology capabilities.

Measures of success:

- 1) Certifications held by local staff.
- 2) Hours worked by staff of village utilities for other villages.
- 3) Number of local circuit riders.
- 4) Reduced number of hours outside experts must be hired.

Internal Training Program

The goal of the internal training program is to use local expertise to improve the efficiency across the CWG member utilities and to institute standard practices and record keeping. This will help CWG to institute a centralized system for spare parts and tools inventory, and will assist the village utilities in adapting to the new smart grid meter data that CWG will provide.

Local training programs will be developed for diesel and wind generation systems, the distribution system, and bookkeeping and administration. The trainers will provide a pool of expertise from which CWG will be able to draw local circuit riders to be replacing the current circuit riders in the future.

Establish Circuit Rider program

Projected energy cost savings and rate reductions can only be realized when the new energy systems are run at peak efficiency, thus they need prudent operation and maintenance. For this project, we developed detailed maintenance, as well as repair and replacement schedules that will be used to develop operational plans for the new systems. Based on these schedules, we estimate that on an annual average basis, each community will require a total of 2,100 labor hours for maintaining diesel generators, 1,000 labor hours for maintaining wind turbines, and 250 labor hours to maintain distribution systems and other utility-related equipment.

In the past, the Alaska Energy Authority (AEA) organized a circuit rider program that was very effective in keeping diesel power systems running efficiently. At the beginning of their useful life, diesel generators in Kipnuk operated twice as efficiently under the AEA circuit rider program, generating between 10 and 14 kWh per gallon of diesel, compared to 6kWh after the circuit rider program ended. A circuit rider program does not only reduce operating and maintenance expenses, it also provides jobs. In fact, after the AEA circuit rider program ended, several private firms offered to provide CWG communities with similar services. CWG will provide community utilities with a circuit rider program.

In the initial phase of this project the CWG will use its inventory of local skills to identify circuit riders for diesel and wind generators, distribution systems. It will also identify those positions for which there are insufficient local skills and will hire circuit riders from outside of the CWG communities who will have the additional task of training local experts. This will need to be structured carefully because the ultimate goal is for the outside trainers to “work themselves out of the job” to the maximum extent possible.

The local circuit riders will provide backup and technical assistance to the member utilities, and will be on call as needed.

Linemen training program

Together with Northwest Lineman's College or another appropriate organization, CWG will create a regional training program for Linemen. The CWG board will review curriculum and implement training programs as a pathway to local line workers. The program is most likely to be a combination of hands on training and in field work, which would lead to a qualified journeyman certification, which is adequate for adoption or endorsement by utilities for line work across Alaska. As a group of village utilities, CWG is in a much better position to not only take advantage of training programs but tailor that training to meet their specific needs.

Goal: To provide support to village utilities for maintenance, repair and troubleshooting and to institute a quality improvement program.

Measures of success:

- 1) Fewer hours of diesel/wind/distribution lines down time
- 2) Fewer gallons of fuel per kWh
- 3) Lower transmission losses (kWh)
- 4) Fewer accounts in arrears
- 5) Better accounting/bookkeeping and reporting

Set up Central Purchasing and Inventory Tracking System

Setting up the inventory and tracking system is estimated to take three months. The CWG CEO will hire consultants to help set up a computerized tracking system to monitor inventories at the different village utilities. This will allow CWG to know at all times, where spare parts are located across all CWG communities so they can be used in case of emergency.

In the initial phase of organizing CWG's training and circuit rider program, the GM will also supervise the creation of a list of commonly needed supplies and spare parts that should be kept on hand, and will arrange to have inventories of these supplies and spare parts on hand. They will be owned by CWG until needed but may be kept at one of the village utilities facilities under agreements that provide for tracking and safekeeping.

Once the central purchasing and inventory system is established it will be managed by the circuit riders with assistance from CWG administrative staff.

Goal: Provide timely delivery of spare parts when system failures occur. Create an essential spare parts list for each utility and develop an inventory tracking system.

Measures of success:

- 1) Fewer hours of down time diesel/wind/transmission
- 2) Reduced average length of outages
- 3) Number of qualified personnel able to operated inventory tracking system
- 4) Spare parts on hand in utilities
- 5) Better accounting/bookkeeping and reporting

Set up Metering Services

Smart grid systems will provide automated meter reading, allow for account prepayment, and separation of heat and electricity sales. The smart grid will lead to operational and billing changes in each utility. CWG will manage the smart grid system, collect the data from the meters, and assist member utilities with their billing needs. Additionally, the meter data is an important component for targeting energy efficiency projects.

The CEO will also arrange for contractors familiar with the Power Cost Equalization Program to assist the village utilities to set up a system for filing reports with the Alaska Utilities Commission. This contractor will work with the CWG's information technology contractor and the bookkeepers of the village electric utilities to develop a reporting system that includes all of the utilities eligible costs and will participate in the first round of local training for accounting and bookkeeping.

Goal: Manage smart meter systems, provide data for bookkeeping and collections, track the sale of excess electricity for heat.

Measures of success:

- 1) Number of stoves sold
- 2) Number of kWh sold for heat
- 3) Fewer accounts in arrears
- 4) Data provided to monitor system efficiency and energy efficiency.

Year Two & Three Work Plan

In year two and three, CWG will focus on the following tasks that will be identified in more detail in year one of the CWG pilot program. The tasks are as follows:

- Implement workforce development
- Develop external training program and certification - the goal of external training is to certify local talent as diesel and wind turbine mechanics, as well as certified lineman to work within CWG utilities. This process will build on the skills already available within CWG member utilities and to bring additional skills back to the CWG system through the internal training and circuit rider program. At the same time the external training program will increase the number of professional certifications held by residents of CWG communities. The goal is to certify operators in the specific generation equipment used in the communities. Since diesel generators and wind turbines are standardized across the communities, the certified operators provide important contingencies for maintaining systems across the communities.
- Develop asset management - The combination of technology advances (e.g. sensors, data communications, computing power, storage, etc.) coupled with substantial decreases in the cost of this technology enables automated on-line monitoring of wind turbines, distribution systems, diesel generator sets and fuel inventory.

These automated information systems collect information from a variety of different sources, to clearly identify which equipment has a higher risk of breakdown and communicates this information to operators so actions to reduce risk can be taken. Critical components to successful automated system management are:

- 1) Clear accounting and view of equipment conditions that will support the best maintenance decisions, better controlled and predictable operations and maintenance spending.
 - 2) Drive the adoption of uniform, consistent and effective maintenance and operational processes.
 - 3) Identify and prioritize the most effective practices and management policies and investment needs that deliver the most benefits at the lowest costs.
- Develop forecasting tools - the core to good data is good data management. Operators and managers need tools to understand operations and have a hand in managing variability of renewable energy resources. Good data is prerequisite for forecasting variability in renewable energy supplies. Forecasting tools must be integrated with real time village energy needs, including automating the combination of wind turbines, diesel generator sets and managed energy storage devices. This will enable general dispatch, outage scheduling and day ahead operation planning.

Data collected through the SCADA system output can be used to both help improve operations performance and inform planning by allowing systems to predict the level of wind, diesel or solar energy expected within the next 15 minutes. As the SCADA system becomes more sophisticated, predictions can be expanded to between one and four hours or even 24 hours in advance.

- Further improve system efficiencies
- Analyze battery storage/diesel off operations
- Expand monitoring projects
- Investigate feasibility of plug in vehicles
- Extend heat recovery loops
- Performance analysis of diesel generator sets
- Develop integrated utility business management system for water and sewer, work with ANTHC on this project
- Develop best practices from within CWG members
- Improve customer service - this task will focus on communication and outreach to consumers within the CWG member communities particularly addressing weatherization and energy efficiency needs.

Year Four Work Plan

CWG will continue the work and programs developed in years 1-3 but expand to potentially include:

- Implementation of construction business
- Implementation of transportation business
- Transportation planning and improvements
- Winter trail marking and safety improvements (e.g. petrasolar)
- Wood delivery program
- Bottled water delivery
- Investigate feasibility of additional CWG business opportunities as mentioned above

CWG MANAGEMENT AND STAFF CONSIDERATIONS

CWG is organized as a 501(c)3 – non-profit organization. CWG is governed by its board of directors made up of the managers of the electric utilities (community liaison officers) in CWG’s member villages, and representatives from each village. As a 501(c) 3 non-profit organization, CWG does not generate power and while it does earn income it does not provide dividends or any payments to its members. The CWG board of directors will take the primary responsibility for implementing this business plan. They will be assisted in the initial planning phase of this project by staff from Intelligent Energy Systems (IES).

CWG Management

CWG management is structured into three categories outlined and conceptually shown in the figure below:

Directive

The CWG Board of Directors controls the CWG decision making progress and is comprised of elected community members and one liaison officer per member utility. The liaison officers are employed by CWG and manage day-to-day operations in the power plants, but are responsible to their individual community utility boards.

Operational

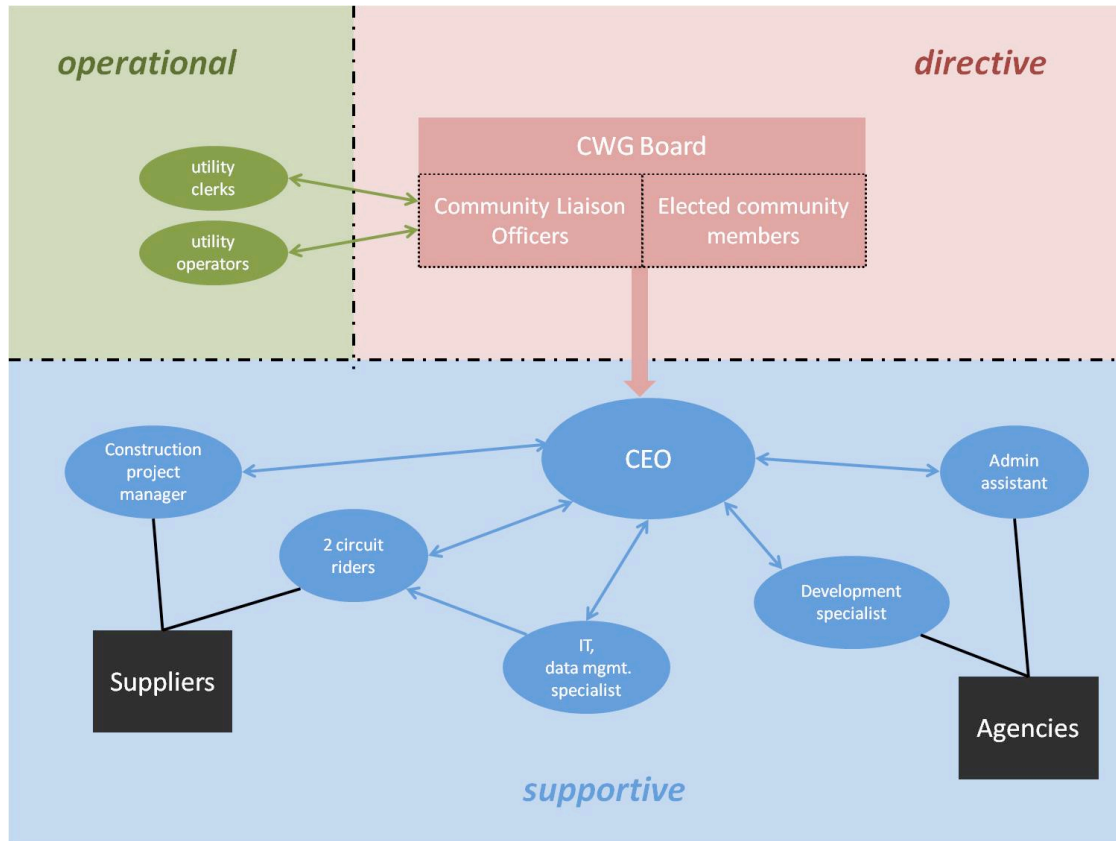
Operational and administrative staff will be employed by each member utility. The utility personnel will receive training through the CWG workforce development program. Their wages and benefit packages are suggested rather than determined by CWG.

Supportive

The CWG support organization is comprised of the Chief Executive Officer (CEO), a construction project manager, two circuit riders, an IT and data management specialist, a development specialist, and an administrative assistant. CWG personnel are responsible for building and fostering relationships with suppliers, potential private industry investors, as well as a range of state and federal agencies.

CWG personnel include:

One CEO
One IT and database management specialist
Two Circuit riders
One Development Specialist
One Construction project manager
One Administrative assistant



The Board of Directors

Collaborative consultation is a deliberative process that aims to create effective collaboration and informed decision making, where each community shares a goal of reaching a decision together and creates an opportunity for equal inputs from all governments.

The CWG board is made up of leaders of the various member utilities (organizations) and controls the decision making process within CWG. It has a participatory budgeting process that permits citizen councils to vote on priorities in their respective communities. CWG will increase the leverage to provide funds to high performance organizations that keep rates stable, achieve renewable energy goals, and are able to significantly improve their capacity and operational skills. After the CWG pilot program, some of the support costs for CWG will be paid for by membership fees, PCE payments, and funds generated through CWG subsidiary operations such as CWG's construction or transportation business.

CWG officers comprising the board will be duly elected or appointed tribal leaders, official delegates designated in writing by the local utility board of each member utility.

Collaborative meeting schedule

The CWG meetings of the board are designed to promote trust, respect, and shared responsibility. CWG meetings should allow for free and open exchange of information. To be sustainable, communities must set aggressive goals.

The CWG board will hold quarterly meetings to develop work plans, program guidelines and budgets proposed by the CEO, development specialist, or others within CWG. The goal is to implement positive solutions for related issues affecting member communities. The following areas are to be considered:

Renewable energy development	Village environmental management
Energy system planning	Construction planning
Energy services, weatherization	Long-term planning for growth
Cost-sharing methods	Budgeting
Operations, maintenance and replacement budgeting	Business development

Quarterly board meetings will be held, either in person, telephonically or electronically. No more than one board meeting is to be held electronically.

Community Liaison Officers

The community liaison officers have a particular role within the organization. They are experienced power plant managers responsible for operations at the power plants. The liaison officers will be knowledgeable in energy related issues. The liaison officers are critical for managing the redesign and reconstruction of electrical distribution systems in each community. They will strive to enhance trusting and ongoing relationships with CWG members.

Together with the CEO and the circuit riders, the community liaison officers will develop best management practices and environmental compliance (emissions standards), as well as operational schedules for their power plants. In addition to being responsible for day-to-day operations, they are responsible for implementing circuit rider and training programs at their power plants.

Each member community will have at least one person designated to fill the role of CWG member liaison officer. Typically this will be the local utility manager and this will be a funded position through CWG. This person will advocate for opportunities and positions consistent with their local utilities mission and objectives, and represent those concerns within the CWG Board.

The liaison officers will also serve as a conduit of information between CWG and its member communities as a way to improve the services CWG provides to its members. The liaison officers will also monitor implementation of CWG's quality improvement program and the adoption of best practices.

Chief Executive Officer

The Chief Executive Officer (CEO) manages operations of the CWG organization on a daily basis. The CWG CEO will establish and propose policies, act at the direction of the board and will communicate quarterly on whether CWG programs and initiatives are achieving their goals based on identified metrics of success.

The CEO will be a full time position overseeing CWG's operations. Responsibilities include:

- Grow CWG into a self-reliant and financially sustainable organization that will serve as a new regional energy collaborative serving rural communities in Western Alaska
- Form the CWG support team
- Communicate regularly with community liaison officers about energy system performance
- Promote cooperation and participation among agencies related to programs and opportunities that affect CWG members, e.g. ANTHC collaboration with AEA on energy systems and use of heat for village safe water system water and sewer utility
- Foster relationships with potential private investors such as regional Alaska Native Corporations and tribes
- Regularly communicate with funding agencies, sponsors, and suppliers
- Seek funding opportunities at the state and federal level
- Implement overall CWG strategic plan outlining how CWG will deliver its products and services
- Direct staff to implement the training schedules, identify program and training opportunities
- Develop and supply contracts, warranty cases
- Identify and bring to the board issues and proposals, and to assure compliance with objectives of the group.
- Manage day-to-day CWG-operations, accounting and communications
- Lead grant application processes
- Research feasibility of advanced technology integration such as energy storage, demand side management, and plug-in vehicles

Minimum qualifications of the CWG CEO

Education: The CEO should have a four year university degree in electrical engineering and/or equivalent degree in project management.

Background: The CEO should have utility management experience and demonstrate his/her ability to build successful teams of local people working towards a common goal. Familiarity with the agencies involved in providing power in rural Alaska including: the Alaska Energy Authority, the Denali Commission, and the U.S. Department of Agriculture, Bureau of Indian Affairs, U.S. Department of Energy are considered beneficial for this position.

Qualities Sought: A vision and desire to grow CWG into a self-reliant business venture that will support rural utilities and create a new regional energy collaborative. The person seeking this position should be a collaborative team player with a desire to make a difference in rural Alaska and the demonstrated ability to work in a multi-cultural environment. Technical understanding of complex energy systems like the ones installed in CWG villages is an advantage.

In addition, the person must have familiarity with the legislative process in Alaska, policy issues and options, be familiar with state and federal regulations, and have existing connections to state and federal agencies as well as a proven track record of writing successful grant applications for several million dollars. He/she must have experience in sales as well as financial management of organizations the size of CWG.

The job of the chief executive officer of CWG is to become one of the regional leaders in managing village and tribally owned utilities. This position will involve improving system reliability, lowering overall operating costs, and bringing more resources to solve the pressing

energy problems in the region. This position will require both initiating programs to increase local involvement, and outreach programs to local, state and federal agencies with the intention of establishing partnerships and develop collaborative businesses to bring jobs to the CWG member villages through support of clean energy, energy efficiency and energy conservation programs. In addition, workforce development will consist of increased training, education and research opportunities and attracting development investments.

He/she must be capable of identifying and formulating strategies for the deployment of renewable energy systems to maximize the economic and community benefits derived from them.

Circuit Riders

CWG's CEO will select two circuit riders, one for diesel generators, and one for wind turbines. Additional circuit riders for the smart grid and the distribution systems will be hired as contract workers. Based on current estimates, diesel and wind circuit riders will work for ten days every two months, visiting every village for two days every other month. Circuit riders for the smart grid, transmission and bookkeeping/administration will visit villages for two days every four months.

The circuit riders are responsible for:

- Developing workforce training curriculum
- Developing prudent operations and maintenance schedules for the utilities together with the liaison officers and the CEO
- Communication back to the CEO on power system performance

Minimum qualifications of the CWG circuit riders

Education: The circuit riders should have at least an electrical or mechanical vocational degree specializing in power generation, commercial industrial electrical and/or diesel generation or related field. A high school degree is preferable. If local people do not have the proper training for these positions, CWG will support the training necessary to enable locals to be hired.

Background: The circuit riders should have at least 10 years of experience troubleshooting, operating, and maintaining electric utility systems.

Qualities Sought: The person seeking this position should have demonstrated leadership, management and organizational skills. The person seeking this position should also be both hands on and able to act as a journeyman who is able to collaborative team player and have experience in teaching others on the job. The person should have a desire to make a difference in rural Alaska and the demonstrated ability to work in a multi-cultural environment.

Information Technology and Data Management Specialist

Smart grid technology can generate enormous amounts of data that can be used to make the energy systems more efficient when managed adequately. The IT and database management specialist serves a critical position within the CWG system to make the most use of available data from the systems.

The IT and data management specialist primarily has the responsibility to develop a comprehensive information system for CWG. This involves the following tasks:

- Data base management combining all SCADA programs into one effective system
- Set up automated reporting system for village electric utilities
- Set up inventory tracking system for centralized purchasing and supply center
- Develop customer web portal monitoring household energy use
- Implement CWG product launch such as metering, and automated reporting
- Work together with suppliers of smart grid technology
- Develop a comprehensive approach to monitoring, data analysis, for optimized systems control
- Develop practices for real-time measurement of current, voltage, and phase angle at the by phase to pinpoint system issues, remedy problems and efficiently manage asset life
- Manage data security
- Consult with village electric utility bookkeepers and with others familiar with the reporting requirements of the Power Cost Equalization program so that CWG's information technology (IT) system provides all of the information needed by utilities

Minimum qualifications of the IT and data management specialist

Education: The IT specialist assistant should have at least a four year university degree in computer programming, preferably a master degree in data base management.

Background: The IT specialist should have five years or more experience working as an IT systems administrator. Experience providing customer service is desirable.

Qualities Sought: He/she should demonstrate strong time management and organizational skills. The person seeking this position should be a collaborative team player with a desire to make a difference in rural Alaska and the demonstrated ability to work in a multi-cultural environment.

Development Specialist

The development specialist is the primary contact person between CWG communities and government agencies as well as other potential funding agencies. He/she will be responsible for the development and implementation of new programs, such as energy efficiency programs, weatherization. Based on village needs, he/she will be seeking agency/funding support for energy related programs and other community needs, some of which were outlined above.

Through CWG, the member villages will be part of the social and governmental dialogue which is important for accessing resources. The development specialist will serve as an important conduit between communities and agencies, particularly as existing programs are subjected to program cuts. Responsibilities include:

- Coordinate CWG's new program activities
- Seek feedback from the community on community needs
- Regularly communicate with funding agencies
- Responsible for implementation of grant applications
- Seeking funding opportunities from state, federal, and other sources
- Inform communities about upcoming grant opportunities

Minimum qualifications of the Development specialist

Education: The development specialist should have at least a four year university degree and have a certificate in sustainable development.

Background: The development specialist should have two years or more experience working as a development specialist in developing countries or rural areas. Experience working for a development organization is desirable. Experience with micro-finance is also preferable. Proven successful track record in grant writing is desirable.

Qualities Sought: The person seeking this position should have demonstrated creativity for developing program support to meet community needs. The person seeking this position should be a collaborative team player with a desire to make a difference in rural Alaska and the demonstrated ability to work in a multi-cultural environment.

Construction Project Manager

The primary responsibility of the construction project manager is to lead future construction projects and manage CWG's construction subsidiary business. This position will be responsible for managing the design and reconstruction of distribution systems. Also, the construction manager together with the circuit riders will develop and foster relationships to suppliers of new technology and parts. Responsibilities include:

- Lead construction projects and associated logistics
- Effectively communicate with suppliers and logistics companies
- Lead seven person construction crew

Minimum qualifications of the Construction Project manager

Education: An associate degree in construction management is preferable or equivalent experience.

Background: The construction project manager should have at least four years of experience working with the logistical and environmental challenges of year-round construction projects in Western Alaska.

Qualities Sought: The person seeking this position should have demonstrated strong time management and organizational skills. The person seeking this position should be a collaborative team player with a desire to make a difference in rural Alaska and the demonstrated ability to work in a multi-cultural environment.

Administrative Assistant

The administrative assistant will aid the CEO in communication between agencies and community liaison officers, help with combined purchasing and logistics, as well as aid in communicating to suppliers and agencies. The administrative assistant will work closely with the CWG staff in handling administrative duties. He/she will help coordinate the circuit rider and training programs and assist in managing IT and centralized purchasing and inventory systems.

The administrative assistant position will be a full-time position filled by someone with either training as a bookkeeper or experience working as a bookkeeper. A person with these skills will need to be paid at least \$25/hour and receive 30% benefits.

Minimum qualifications of the CWG administrative assistant

Education: The administrative assistant should have at least a high school degree. A four year university degree in English or communications is desirable.

Background: The administrative assistant should have two years or more experience working as an administrative assistant in one of the CWG communities and be a Yupik speaker in addition to having excellent written and oral communications skills. Experience providing customer service is desirable.

Qualities Sought: The person seeking this position should have demonstrated strong time management and organizational skills. The person seeking this position should be a collaborative team player with a desire to make a difference in rural Alaska and the demonstrated ability to work in a multi-cultural environment.

Supplemental rules, policies and procedures

The CWG board in collaboration with the CEO will create policies which will affect CWG's operations. This includes the development of bylaws, operating agreements, and other policies which are needed to address CWG actions.

Proposal development stage

The proposal development stage begins once the CWG board has directed the CEO to implement program actions. The CWG Board of Directors should consider specific community needs and work with the CEO, communities and agencies to proceed with implementation of a plan to reach these objectives. The CEO will then proceed with the authority of the board.

Program management guidelines

The CWG board will establish guidelines, as uniform practices, that all CWG communities can use to develop and execute program objectives. These guidelines are agreed upon protocols which will improve efficiency and transparency in CWG practices in order to maximize CWG collaborative success.

Program selection

Any member of a CWG community, through their community liaison officer, can propose a project or policy for the CWG board. The program office will strive to ensure that CWG member community boards are notified at least 30 days in advance prior to a meeting or program proposal deadline. If exceptional circumstances prevent notice within 30 days of program or funding opportunity, explanation of an abbreviated notification will be provided in an email or letter from the CEO.

Adequate notice entails providing a description of the topic(s) to be discussed or action to be considered. The CEO will then contact each CWG liaison member and discuss program

involvement. This will give leaders an opportunity to be fully engaged. The CEO will reach a preliminary decision on the issue. The CEO will then provide a brief email discussing the issues, a timeline for the process and possible outcomes.

Initial planning

Each quarterly meeting shall be guided by an initial planning stage, in which the CWG board develops an action plan which will then be reviewed and revised if necessary. The CEO will develop and provide an outline and written copies of the previous plans. The CEO will be assisted by the program managers and grant administrators. Planning activities include efforts to prepare funding or program proposals and include development of appropriate or required policies or procedures.

CWG recognizes that increasing the efficiency of energy use by consumers requires adopting programs for promoting energy efficiency.

Communications

The CWG policy framework will synchronize consultation practices between village utilities and governmental agencies where statutory, administrative and program opportunities exist. The CWG central office will be responsible for regular and-meaningful communication between CWG liaison officers, governmental agencies and CWG membership. The methods of communication include:

- Quarterly newsletter
- Web page, updated quarterly
- Regular meetings

The CEO will notify and arrange the quarterly meeting. At these meetings, the CEO will notify communities of existing funding opportunities and needs to determine CWG actions.

The CEO will appropriately communicate with agencies about CWG matters and can be designated by a majority of the board and community liaison officers to consult with agencies to seek, and promote cooperation and participation between agencies related to programs and opportunities affecting CWG members.

Accounting

The CWG CEO will be responsible for ensuring accountability and reporting requirements are met for all program funding. The CEO with the board will develop an annual performance plan and standard performance measures consistent with this policy.

On a quarterly basis, the CEO will report to the CWG board the results of their efforts to promote and reach stated objectives. Methods for reporting will consist of budget expenditures, narratives describing significant efforts, and anticipated and/or proposed forthcoming actions.

The CEO will maintain a list of agency contacts, program announcements and funding opportunities, and will take special care to open avenues to new program activities.

CWG BUDGET ANALYSIS

For the implementation of the CWG pilot program, \$3,017,492 is estimated as start-up-costs, outlined as follows:

Initial Capital Investment	\$1,831,000
Net income bridge - year 1	\$845,529
Net income bridge - year 2	\$340,962
Total request	\$3,017,492

Budget Detail

CWG income will come from a variety of sources including membership fees for technical assistance through CWG's circuit rider program and other member services (outlined above), and energy product sales to non-member utilities and organizations. In addition, CWG will receive income through its subsidiaries in construction and transportation further diversifying its income stream. On the next page we outline revenue and expense assumptions in more detail.

CWG Pilot Program Budget	Initial capital	CWG-pilot program			
		Year 1	Year 2	Year 3	Year 4
1) Energy product sales					
Assumptions					
Whole sale cost of stove plus shipping	\$	2,500	\$ 2,563	\$ 2,563	\$ 2,563
Stove mark up	\$	625	\$ 641	\$ 641	\$ 641
Membership rates wind diesel	\$	-	\$ -	\$ -	\$ 10,000
Membership rate diesel	\$	-	\$ -	\$ -	\$ 8,000
Wind diesel villages added	0	0	0	1	0
Diesel villages added	0	0	1	0	0
addit. stoves per community	3	3	3	20	20
addit. meter rentals	0	0	200	200	200
Total customers renting meters			200	400	400
Total grant money being brought in			\$ 100,000	\$ 200,000	\$ 200,000
Total wind-diesel	4	4	4	5	5
Total diesel	0	0	1	1	1
Total Membership	4	4	5	6	6
Revenue					
1) CWG technical assistance					
Wind diesel memberships	\$	-	\$ -	\$ -	\$ 50,000
Diesel memberships	\$	-	\$ -	\$ -	\$ 8,000
2) Parts sales					
Stove sales margin	\$	1,875	\$ 1,922	\$ 1,922	\$ 12,813
Wind-diesel parts	\$	20,000	\$ 20,500	\$ 20,500	\$ 25,625
Diesel parts	\$	-	\$ -	\$ 3,588	\$ 3,588
3) Meter rental					
Initial sign up fee	\$	-	\$ -	\$ 10,000	\$ 10,000
Meter rental margin annually	\$	-	\$ -	\$ 7,200	\$ 14,400
4) Energy grant management					
Grant management	\$	-	\$ -	\$ 15,000	\$ 30,000
5) PCE reporting services					
PCE reporting services	\$	1,200	\$ 1,200	\$ 1,500	\$ 1,800
Total revenue - energy services	\$	23,075	\$ 23,622	\$ 59,709	\$ 156,225
Cost					
1) CWG technical assistance					
1.1) Internal training	\$	220,000	\$ 5,000	\$ 5,000	\$ 5,000
1.2) external training	\$	80,000	\$ 10,000	\$ 10,000	\$ 10,000
1.3) Tools	\$	60,000	\$ 3,000	\$ 3,000	\$ 3,000
2) Parts sales					
Labor for set up	\$	5,000			
Computer	\$	4,000			
Software	\$	2,000			
Storage for Parts (4 containers 40ft)	\$	28,000			
3) Meter rental					
Develop customer web portals with prepay option	\$	75,000			
4) Energy grant management					
Note, cost accounted for in CWG costs below.					
5) PCE reporting services					
Data base management system	\$	75,000			
Total cost - energy services	\$	549,000	\$ 18,000	\$ 18,000	\$ 18,000
Netincome energy product sales	\$	5,075	\$ 5,622	\$ 41,709	\$ 138,225

CWG Pilot Program Budget, cont.		CWG-pilot program			
	Initial capital	Year 1	Year 2	Year 3	Year 4
2) Transportation					
Initial Investment					
Storage and garage	\$ 100,000				
Tractor	\$ 250,000				
10ft thermo storage container	\$ 40,000				
Sled	\$ 80,000				
Trail markers	\$ 1,000				
Snowmachine backup	\$ 5,000				
Navigation equipment	\$ 1,000				
Communication/safety	\$ 1,000				
Total	\$ 478,000				
Revenue					
Total snow cat "milk runs" between villages and Bethel per season		10	14	16	20
Revenue from snow cat operations		\$ 134,855	\$ 188,797	\$ 215,768	\$ 269,710
Cost					
Storage rental in Bethel		\$ 67,428	\$ 94,399	\$ 107,884	\$ 134,855
Total		\$ 67,428	\$ 94,399	\$ 107,884	\$ 134,855
Netincome transportation		\$ 67,428	\$ 94,399	\$ 107,884	\$ 134,855
3) Construction					
Initial Investment					
Training:					
2 Crane and heavy equipment operator training and license	\$ 30,000				
2 Project management courses at UAA	\$ 24,000				
Capital:	\$ 750,000				
Total	\$ 804,000				
Profit					
Total annual projects worth			\$ 1,500,000	\$ 3,000,000	\$ 3,000,000
Profit from construction and project management		\$ -	\$ 500,000	\$ 1,000,000	\$ 1,000,000
Profit from environmental clean up					\$ 100,000
Netincome construction		\$ -	\$ 500,000	\$ 1,000,000	\$ 1,100,000
4) CWG administration					
CWG labor					
Wages					
2 Circuit riders		\$ 160,160	\$ 164,164	\$ 168,268	\$ 172,475
4 Community Liaison Officers		\$ 104,000	\$ 106,600	\$ 109,265	\$ 111,997
CEO		\$ 100,048	\$ 102,549	\$ 105,113	\$ 107,741
Development specialist		\$ 80,080	\$ 82,082	\$ 84,134	\$ 86,237
Project management construction		\$ 80,080	\$ 82,082	\$ 84,134	\$ 86,237
IT specialist		\$ 60,112	\$ 61,615	\$ 63,155	\$ 64,734
Administrative assistant		\$ 40,040	\$ 41,041	\$ 42,067	\$ 43,119
Subtotal salaries		\$ 624,520	\$ 640,133	\$ 656,136	\$ 672,540
Subtotal benefits and taxes		\$ 227,950	\$ 233,649	\$ 239,490	\$ 245,477
Subtotal personnel		\$ 852,470	\$ 873,782	\$ 895,626	\$ 918,017
Travel (staff and board)					
Subtotal travel		\$ 40,690	\$ 41,707	\$ 41,707	\$ 41,707
Contracting services					
Subtotal		\$ 8,000	\$ 8,200	\$ 8,200	\$ 8,200
CWG G&A					
Rent		\$ 12,000	\$ 12,300	\$ 12,300	\$ 12,300
Telephone		\$ 2,400	\$ 2,460	\$ 2,460	\$ 2,460
Equipment		\$ 672	\$ 689	\$ 689	\$ 689
Supplies		\$ 600	\$ 615	\$ 615	\$ 615
Utilities		\$ 1,200	\$ 1,230	\$ 1,230	\$ 1,230
Total		\$ 16,872	\$ 17,294	\$ 17,294	\$ 17,294
Admin cost		\$ 918,032	\$ 940,983	\$ 962,827	\$ 985,218
CWG Net Income		\$ (845,529)	\$ (340,962)	\$ 186,766	\$ 387,862

Important Assumptions

		Year 1	Year 2	Year 3	Year 4
Energy product sales	Revenue	\$20,000 parts and stove sales to other villages	\$20,000 parts sales to other villages	\$60,000 parts and stove sales, meter rental, PCE reporting services, etc.	\$90,000 2 new members, member fees, grant mgmt.
	Cost	staff time	staff time	staff time	staff time
	Jobs	7 CWG staff	7 CWG staff	7 CWG staff	7 CWG staff
Transportation	Revenue	10 trips between villages and Bethel. Price/lbs: \$0.54	14 trips	16 trips	20 trips
	Cost	Cost/trip: \$5,700 fuel \$800, 2 drivers: \$1,000, Storage: \$3,600 Admin: \$250 Cost/lbs: \$0.27			
	Profit	Profit: \$0.27 /lbs loads at capacity			
	Jobs	2 drivers, 1 admin	2 drivers, 1 admin	2 drivers, 1 admin	4 drivers, 1 admin

Construction	Profit		1 power line project worth \$1.5 million, profit margin 33%	2 power line projects	2 power line projects, boardwalks, environmental clean up
	Jobs		1 manager, 7 workers	1 manager, 7 workers	1 manager, 10 workers

Detailed Expense Assumptions

CWG Office Expenses

CWG staff will have to travel to coordinate the Wind Group's activities. We estimate that the CEO will travel to Bethel eight times, three times to attend board meetings and five times to oversee parts of the training preparation and circuit rider program. The CEO will also travel to the CWG member villages four times to oversee training and circuit rider visits. CWG's administrative assistant will travel to Bethel three times to attend board meetings. CWG will also provide support for its board meetings. It is anticipated that the board will meet in person quarterly. We estimate the total cost of travel to equal approximately \$40,000 annually.

Our estimates for CWG office expenses include \$1,000 per month in rent, \$200 per month for communications, \$56 per month for equipment, \$50 per month for supplies, and \$100 per month for utilities.

Training Expenses

In addition to the travel costs, CWG will have expenses related to offering training courses.

The internal training program involving local trainers and outside specialists to assist them will cost \$220,000. This includes transportation costs for the trainers to come to Bethel twice to prepare for courses, and four trips to villages to train. It also includes travel expenses for the trainer assistants to come to Bethel twice and to go with the trainer to each of the villages. Travel costs for each of the five specialty areas (diesel, wind, accounting, and transmission and information technology) are estimated at \$3,955.

CWG also expects to send some local specialists to training programs outside of the CWG region. These costs are estimated to total \$80,000.

CWG will also have expenses related to tools that are required for the training and circuit rider program in the amount of \$60,000.

Central Web Based IT System

The estimated cost of establishing a central purchasing, inventory system, and supporting IT infrastructure is \$205,000. This system includes the creation of a web based data storage and inventory management system including a web based inventory maintenance system. The web pages will be more than information about communities, instead it will be a dynamic web portal that aggregates all current SCADA and component performance data.

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APPENDIX

Village Profiles

Kongiganak:

Population (year 2000): 359.

Estimated median household income in 2007: \$43,800.

Approximately half of the employment in Kongiganak is at the school. The remaining employment is with village services, stores, and commercial fishing. 28 residents hold commercial fishing permits. Poor returns and reduced salmon prices in recent years have affected the economy. Subsistence activities are important supplements to income. Some trapping occurs.

A State-owned 1,885' long by 35' wide gravel airstrip is available. Snowmobiles, boats and skiffs provide local transportation to Bethel and other area villages. Winter trails exist to Kwigillingok (11.1 mi.) and Tuntutuliak (29 mi.) There are no docking facilities; barges deliver cargo once or twice each summer.

Tuntutuliak:

Population (2008 estimated): 401.

Estimated median household income in 2007: \$33,591.

The main employers are the school, government and utilities. Commercial fishing and fish processing provides additional income as do trapping, basket weaving, skin-sewn products and other Native handicrafts. Subsistence foods comprise a majority of the diet, and about one-half of families go to fish camp each summer. 51 residents hold commercial fishing permits for salmon net and herring roe fisheries.

Tuntutuliak relies heavily on air transportation for passengers, mail and cargo service. A State-owned 1,772' long by 28' wide gravel runway, and a public seaplane base on the Qinaq River are available. Plans are underway to relocate the airport. Barge services deliver goods approximately six times a year. Boats and snow machines are used for local travel. Winter trails are marked to Kipnuk (77 mi.), Toundra (60 mi.) and Kongiganak (29 mi.).

Kwigillingok:

Population (2007) 361.

Estimated median household income in 2007: \$47,752.

Most employment in Kwigillingok is with the school, village government, stores or commercial fishing. Income is supplemented by subsistence activities. 37 residents hold commercial fishing permits. A local arts and crafts cooperative markets local handicrafts. The village would like to expand the cooperative.

A State-owned 2,510' long by 60' wide gravel airstrip is available. A seaplane base is also available. There are no docking facilities, although a number of residents have fishing boats or skiffs for travel to Bethel and area villages. Snowmachines and ATVs are used during winter, and boardwalks are used for local walkways in the village. Winter trails are marked to Kipnuk (35 mi.) and Kongiganak (11.1 mi.).

Kipnuk:

Population 688.

Estimated median household income to 2007: \$45,282.

Most employment in Kipnuk is in seasonal activities such as commercial fishing and construction. Subsistence activities are a major component of the Kipnuk lifestyle. 97 residents hold commercial fishing permits. Coastal Villages Seafood, Inc., processes halibut and salmon in Kipnuk. Income is also obtained by trapping. The community is also interested in an arts and crafts marketing cooperative.

Kipnuk offers a State-owned 2,120' long by 35' wide gravel airstrip, with scheduled air taxi service five times each day. A seaplane base with charter services are available. Boats and skiffs are used by residents for local travel during the summer, with snowmachines in the winter. Winter trails exist to Tuntutuliak (77 mi.), Chefornek (20 mi.) and Kwigillingok (35 mi.) Although there is no dock, barges from Bethel deliver cargo each summer. It is a local priority to construct docking facilities.